

# **ATTACHMENT D**

**Accident Investigation Party Submission  
by the City and County of San Francisco  
under 49 CFR § 845.27**

**NTSB Accident File: DCA13MA120**

# BEYOND ASIANA 214 MOVING FORWARD TOGETHER

## FINAL REPORT



San Francisco  
International  
Airport

December 31, 2013

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## Executive Summary

### Introduction

Situated 13 miles south of downtown San Francisco and uniquely located within and entirely surrounded by San Mateo County, San Francisco International Airport (SFO), a department of the City and County of San Francisco, is one of the top ten busiest airports in the United States with its Air Traffic Control Tower (ATCT) handling more than 36,312 operations in June 2013.<sup>1</sup>

On July 6, 2013, at approximately 11:27 AM Pacific Daylight Time (PDT), Asiana 214, en route from Seoul, South Korea, crashed at SFO. As the flight prepared to land on runway 28L, the Boeing 777-200ER's tail section collided with the seawall short of the runway. Following the crash, SFO was closed for approximately four hours. Flights destined for San Francisco were diverted to Oakland, San Jose, Sacramento, Los Angeles, and Seattle-Tacoma airports. Due to the professional and heroic efforts of the first responders, airport personnel, and the airport's aviation partners, the airfield was safely and efficiently closed, the immediate emergency responded to, and the crash site quickly cleared of survivors and debris. As tragic as the incident was, the response was considered by the community of responding organizations to have been a success in a number of significant respects:

- **Unified Command and Interagency Collaboration** – Airport executives and senior members of the public safety community agree that on-scene cooperation among the jurisdictions involved was effective as a function of the familiarity and collegial relationships that have developed over time through ongoing training and exercises. When decisions needed to be made, they were made together, quickly, and with little apparent friction.
- **First Responder Actions** – Airfield operations, fire, police, and emergency medical services units generally performed well, demonstrated a high degree of technical ability, and executed their individual missions in a manner that contributed greatly to the speed and effectiveness of overall lifesaving efforts. Those involved credited their individual agency training programs and operational experience, as well as routine airport exercises, for that success.
- **Disaster Recovery and Continuity of Operations** – The immediate and inclusive approach taken by airport, airline, and engineering personnel to plan for the recovery of the aircraft hull, perform repairs to the runway, and ensure the mitigation of any environmental impacts was instrumental in the airport's return to full operations well ahead of original estimates. The adaptive use of project management tools and executive leadership intervention in recovery planning were key in this regard.
- **Strategic Communications** – Despite the highly dynamic and sensitive nature of the tragedy and the overwhelming demand for information, airport management, in close collaboration with its public safety and airline partners, was considered to be proactive in its engagement of the media, its progressive use of social networking tools, and its sharing of the best information it had as quickly as possible, under the circumstances, with its stakeholders and the public.
- **Airport Leadership and Core Values** – The one constant that was cited as a critical success factor across the entire life of the Asiana 214 incident was the energetic leadership

demonstrated by airport executive staff and senior members of the airport's police and fire units. The manner in which this leadership team conducted itself was in keeping with SFO's values around shared purpose, operational excellence, openness, and mutual respect.

Notwithstanding the contributions to successful management of the Asiana 214 incident cited above, there are always opportunities for improvement and lessons learned that can be applied to the airport community's management of future disaster events. As with most such disasters, emergency management and public safety agencies will be conducting their own highly structured After Action Reviews (AARs) of Asiana 214 as a means of evaluating the actual versus planned performance of their respective organizations. In addition, more rigorous investigations of various aspects of the incident are being conducted, like that by the National Transportation Safety Board (NTSB), on the possible causes of the incident itself. While those AAR activities and investigations proceed, SFO executive leadership decided to look beyond the Asiana 214 incident and, with the help of the larger airport community and its public safety partners, consider what was learned and the implications of those lessons for long-term improvement in emergency preparedness, response, recovery, and emergency medical capabilities.

## Purpose & Objectives

In order to effectively capture response, recovery, and emergency medical actions taken by SFO and supporting partners, as well as identify opportunities for improvement, SFO executive management decided to conduct a series of facilitated debriefing sessions with help from a team of aviation and emergency management professionals from ICF International. These debriefs allowed first responders from San Mateo and San Francisco counties, airport personnel, and airport leadership to discuss and analyze the actions taken following the Asiana 214 incident. [A more detailed list of participating agencies can be found within each debrief introduction as well as in Appendix A.] Prior to the beginning of the debrief series, SFO leadership established an overall set of objectives to guide the effort, which were reviewed and endorsed by San Francisco Mayor Edwin M. Lee. Those objectives reflect the intent of the debrief series and were designed to encourage the discovery and capture lessons learned:

1. Document the successes and lessons learned from the event
2. Evaluate and understand the complex response activities that the multitude of local and federal agencies made in the first twelve hours after the crash
3. Set the stage for possible revision of manuals, policies, and procedures as needed in response to the lessons learned
4. Improve existing training and/or implement new training to ensure SFO is as prepared as possible for future incidents

## Summary of Approach and Design

The theme for the debrief series, *Beyond Asiana 214 – Moving Forward Together*, reflects the intent of SFO leadership to reach beyond the incident of July 6<sup>th</sup> and to focus on those lessons learned that would not only enhance the airport community's capabilities in response to and recovery from a future incident, but also improve day-to-day safety awareness and routine emergency preparedness. Debriefs were organized using National Preparedness Goal (NPG) mission areas and Public Health Preparedness

Capabilities across three distinct components of the incident – Response, Recovery, and Medical Surge / Family Assistance – to concentrate debrief discussions around specific target audiences and types of activities. The debriefs were further broken up by modules that examined each phase or activity in order of its occurrence. Using relevant NPG core capabilities and National Incident Management System (NIMS)<sup>2</sup> components as a framework, participants were able to highlight specific best practices and lessons learned requiring further consideration. The debrief series schedule was as follows:

■ Kick-off Breakfast	July 30, 2013
■ Response Debrief	August 7, 2013
■ Recovery Debrief	August 8, 2013
■ Medical and Family Assistance Debrief	August 14, 2013
■ Airport Management and Staff Briefing	September 4, 2013

Through structured, facilitated discussions, debrief participants provided numerous examples of what they believed were sound operational practices that need to be replicated for future application, as well as aspects of response and recovery that could have been accomplished better or otherwise could be improved to help ensure that the handling of future incidents of this nature are even more successful. The refinement and expansion of these best practices and lessons learned, as referenced in this report, provide an initial baseline for continuous improvement in response and recovery capabilities by the SFO airport community and its regional public safety and emergency medical partners.

This *Beyond Asiana 214 – Moving Forward Together* Summary Report is meant to support and guide SFO's continuous improvement in emergency preparedness and reinforce its ongoing commitment to overall operational excellence. It should be noted that the report is based solely on the input provided by participants during the debriefs with the reinforcement of some supplemental research and the inclusion of related information and best practices. It is not an exhaustive examination of the incident or in any way a substitute for the more thorough AARs conducted by participating agencies. Although it provides an important point of departure for ongoing improvement, it is not in itself sufficient to manage a more deliberate improvement program. The information contained herein will need to be vetted with SFO's airport community and public safety partners and a detailed implementation plan prepared that outlines milestones, resources requirements, and accountability.

## Priority Best Practices and Lessons Learned

A team of experienced aviation and emergency management professionals from ICF International facilitated each debrief and assisted members of the SFO airport community and its public safety partners in capturing best practices and lessons learned. The observations made by the participants and the expansion of those observations in this report have been aligned with other nationally recognized emergency management, emergency medical, and family assistance best practices to provide the initial basis for SFO's advancement of an ongoing emergency preparedness improvement plan. While some of the lessons learned identified during the debriefs are unique to SFO, most of the remaining issues are common challenges throughout the emergency management community and will require a coordinated response on the part of SFO and its airline and public safety partners.



It must be recognized that even before the debriefing sessions were complete and during the course of the writing and review of this report, SFO management, in partnership with its public safety and airport partners, has already taken proactive steps to plan for and where possible initiate improvements in preparedness, response, and recovery capabilities in line with the observations and recommendations contained herein. Those efforts will accelerate with the development and implementation of a comprehensive lessons learned improvement plan.

To provide focus for SFO's continuous improvement effort, the following ten priority observations merit special consideration. The full inventory of 27 observations and associated recommendations are covered in detail within the following sections of this report.

#### ■ **Emergency Alert and Notification Systems (page 22)**

A highly reliable emergency alert and mass notification system is essential to the speedy and effective mobilization of emergency responders and ongoing communication with survivors and other impacted individuals throughout a crisis.

**Recommendation:** Acquire a new alert and mass notification system that is robust, compatible with regional systems, and meets SFO requirements for informing both first responders and key individuals across the airport community.

#### ■ **Emergency Communications Interoperability (page 25)**

A robust communications plan and the use of common and/or compatible communications platforms for incident command provide a means to help achieve unity of effort across a widely diverse set of responding organizations.

**Recommendation:** Develop a Communications Plan Annex to the Emergency Procedures Manual that implements radio system interoperability protocols and/or frequency sharing arrangements to strengthen effective interagency coordination.

#### ■ **Incident Command System (ICS) (page 29)**

If fully employed, the ICS accommodates incident escalation and expansion in span of control and, through the integration of all needed partners, drives unity of effort and best use of available assets.

**Recommendation:** Train Incident Commanders and other response leaders in the full application of ICS, to include delegation of key roles, and amend SFO response plans to emphasize inclusion of civilian partners and proper transfer of command.

#### ■ **Emergency Operations Center (EOC) (page 31)**

EOCs are important links in the incident management hierarchy when appropriately implemented within an ICS framework and integrated with the Incident Command Post and other regional EOCs.

**Recommendation:** Better define the role of the EOC in SFO incident management and in relationship to San Francisco and San Mateo counties, prepare an EOC Standard Operating

Procedure (SOP) supportive of those relationships and processes, and identify and train personnel to fill key EOC positions.

#### ■ **Planning Requirements & Emergency Procedures Manual (EPM)** (page 40)

Beyond basic FAA requirements, good Airport Emergency Plans must be functional, exemplify best practice, reflect broad stakeholder engagement, and be harmonized with other local and regional emergency plans.

**Recommendation:** Conduct a thorough critique of the SFO EPM, organize a joint agency planning effort to revise its contents in line with Federal Aviation Administration (FAA) and Federal Emergency Management Agency (FEMA) guidance, and integrate it with other local and regional plans.

#### ■ **Business Continuity Programs** (page 47)

Successful business continuity programs are based on in-depth understanding of mission essential business processes and anticipation of early recovery decisions facing organizational leadership.

**Recommendation:** Establish a comprehensive business continuity program based on risk and business process analyses, coordinated plans and procedures, anticipated resource requirements, and organizational systems for implementation and management.

#### ■ **The Role of the EOC in Recovery Management** (page 49)

Emergency management spans a continuum from response through recovery, and although the players change, the EOC provides a valuable focal point for coordinating every phase of that continuum.

**Recommendation:** Ensure that EOC plans clearly outline roles, responsibilities, and procedures for organizing and monitoring recovery activities and identify how to implement resource management processes.

#### ■ **Customer Service During Recovery** (page 54)

Quality customer service is a determining factor in an airport's public image and competitive position and therefore must remain a high priority throughout both response and recovery operations.

**Recommendation:** Develop strategies to incorporate customer service priorities into response and recovery planning and processes, to include an emphasis on public engagement and communication.

#### ■ **On Scene Medical Operations Coordination with Regional Providers** (page 61)

Medical assets available to support a response at SFO must be integrated into the overall incident management framework and operations in a way that fits each entity's mission and scope of practice.

**Recommendation:** Conduct an assessment and determine the most effective and efficient use of the SFO Medical Center in coordination with other medical assets available for incident response.

■ **Family Reunification and Privacy Laws** (page 67)

Following an airline crash, numerous entities need information on survivor location and health status, which can overwhelm a hospital's ability to confirm those entities' need to know and right to know the information.

**Recommendation:** The Bay Area healthcare community must develop procedures to support the sharing of patient information to aid in Family Reunification after aircraft emergencies and other disasters.

## Debrief Overview

### Introduction

San Francisco International Airport (SFO) is one of the top ten busiest airports in the United States with its Air Traffic Control Tower (ATCT) handling more than 36,312 operations in June 2013.<sup>3</sup>

On July 6, 2013, at approximately 11:27 AM Pacific Daylight Time (PDT), Asiana 214 from Seoul, South Korea crashed at SFO.

During the final approach into runway 28L, the Boeing 777-200ER's tail section collided with

the seawall short of the runway. Both engines and the tail section separated from the aircraft. The remainder of the hull and wings rotated counter-clockwise 360 degrees as it slid westward over the airfield.<sup>4</sup> Images and video confirmed that the hull pivoted while sharply inclined to the ground, similar to a cartwheel movement. The hull, including the fuselage and wings, came to rest to the left of the runway, 2,400 feet from the initial point of impact at the seawall.<sup>5</sup>



Approximately 300 feet from where Asiana 214 came to rest, only one outbound flight (United 885, a fully loaded B747-400) sat at the end of taxiway Foxtrot awaiting clearance for takeoff to Osaka, Japan.<sup>6</sup> It is not unusual for multiple aircraft to be taxiing or waiting for authorization for takeoff while others are landing. Under the right conditions, taxiway Foxtrot may have several wide-body passenger and/or cargo aircraft in the queue for departure. Moreover, as the Bay Area is known for possible unfavorable weather conditions such as fog and strong winds and, combined with the demanding intensity of daily aviation operations, there is little room for error by airport and airline personnel. Fortunately, the weather on July 6 was highly favorable and featured plenty of sunshine with moderate winds and minimal cloud cover.<sup>7</sup> The ultimate resting place of the crash, the absence of a long queue of aircraft on taxiway Foxtrot, and highly favorable weather all provided optimal conditions for conducting emergency response and recovery operations.

Following the crash, all four runways at SFO were closed for approximately four hours. Flights destined for San Francisco were diverted to Oakland, San Jose, Sacramento, Los Angeles, and Seattle-Tacoma airports. All departures from SFO were held at their respective gates or cancelled. Due to the professional and heroic efforts of the first responders and airport personnel, the airfield was safely and efficiently closed, the immediate emergency responded to, and the crash site cleared of survivors and debris in an expedited timeline as reflected in Figures 1 and 2.

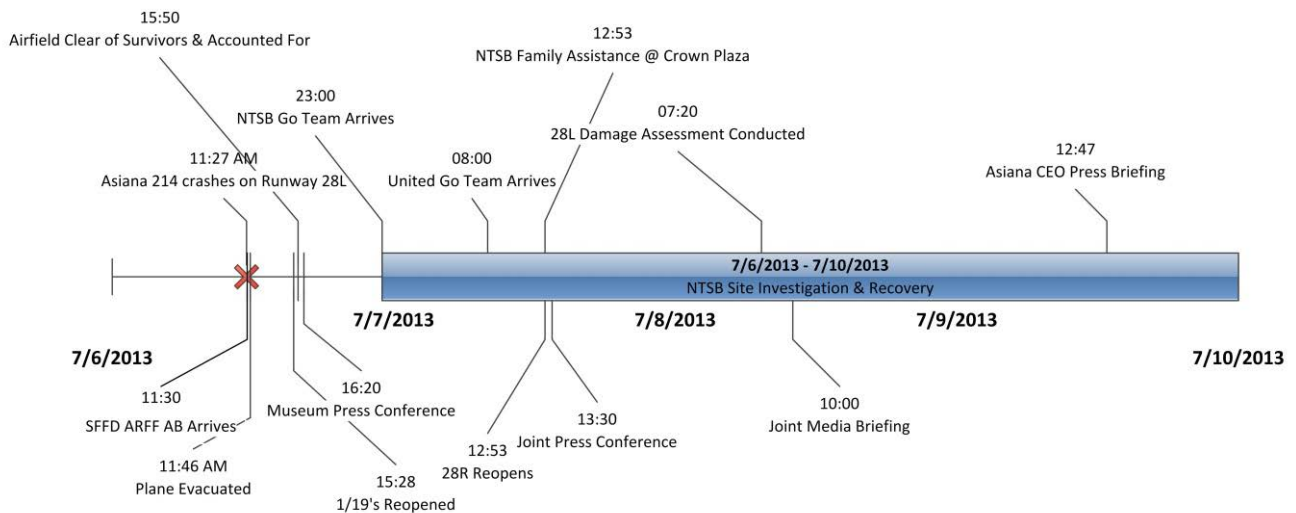


Figure 1. Asiana 214 Response Timeline

By 3:30 PM PDT, perpendicular runways 01L/19R and runway 01R/19L were reopened, while the parallel runway 10L/28R remained closed for only another 24 hours. The accident runway, 10R/28L, reopened only 6 days later on July 12 after being repaired and repaved, well ahead of the initial schedule.

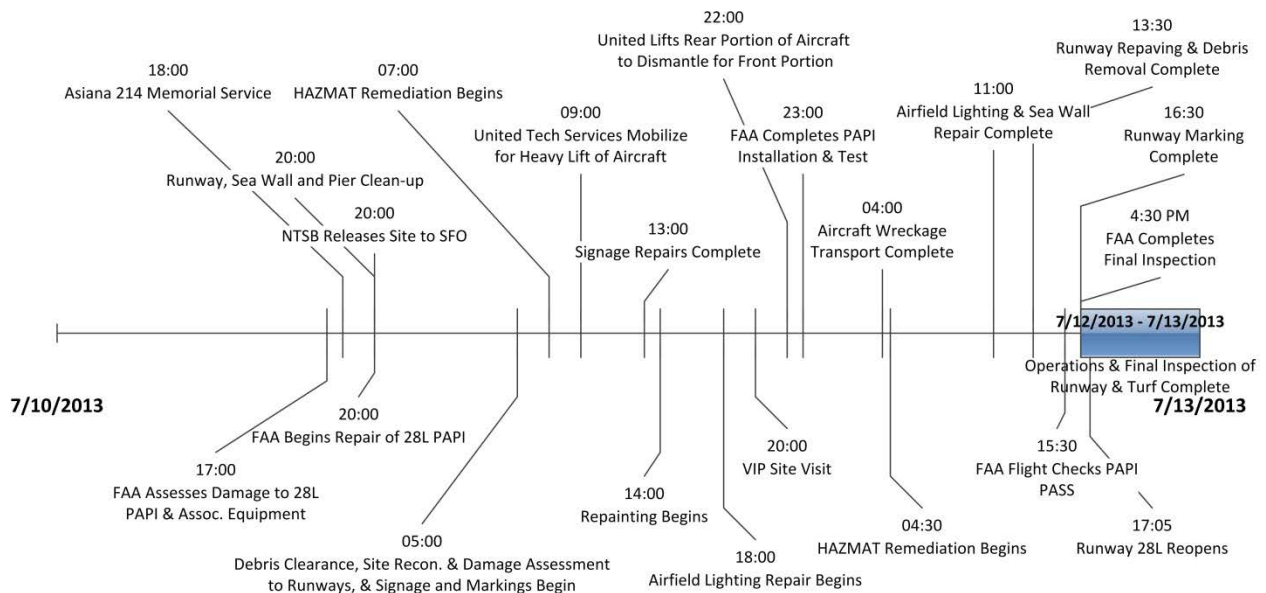


Figure 2. Asiana 214 Recovery Timeline

As tragic as the incident was, when reflecting on how events unfolded, the management of the emergency response was considered by the community of responding organizations to have been a success in a number of significant respects, such as:

- Unified Command and Interagency Collaboration – Airport executives and senior members of the public safety community agree that on-scene cooperation among the jurisdictions involved was effective as a function of the familiarity and collegial relationships that have developed over time through ongoing training and exercises. When decisions needed to be made, they were made together, quickly, and with little apparent friction.
- First Responder Actions – Airfield operations, fire, police, and emergency medical services units generally performed well, demonstrated a high degree of technical ability, and executed their individual missions in a manner that contributed greatly to the speed and effectiveness of overall lifesaving efforts. Those involved credited their individual agency training programs and operational experience, as well as routine airport exercises for that success.
- Disaster Recovery and Continuity of Operations – The immediate and inclusive approach taken by airport, airline, and engineering personnel to plan for the recovery of the aircraft hull, perform repairs to the runway, and ensure the mitigation of any environmental impacts was instrumental in the airport’s return to full operations well ahead of original estimates. The adaptive use of project management tools and executive leadership intervention in recovery planning were key in this regard.
- Strategic Communications – Despite the highly dynamic and sensitive nature of the tragedy and the overwhelming demand for information, airport management, in close collaboration with its public safety and airline partners, was considered to be proactive in its engagement of the media, its progressive use of social networking tools, and its sharing of the best information it had as quickly as possible, under the circumstances, with its stakeholders and the public.
- Airport Leadership and Core Values – The one constant that was cited as a critical success factor across the entire life of the Asiana 214 incident was the energetic leadership demonstrated by airport executive staff and senior members of the airport’s police and fire units. The manner in which this leadership team conducted itself was in keeping with SFO’s values around shared purpose, operational excellence, openness, and mutual respect.

## Purpose & Objectives

In order to capture successful response, recovery, and emergency medical actions taken by the airport and supporting counties, as well as identify opportunities for improvement, SFO executive management initiated a series of facilitated debriefs. These debriefs allowed representatives from throughout the airport and responder community to discuss and analyze the actions taken to manage the emergency. Prior to the beginning of the debrief series, SFO leadership established the following overall objectives, reviewed and endorsed by San Francisco Mayor Edwin M. Lee, to reflect the intent of the debrief series and to encourage the discovery and capture of best practices and lessons learned from the incident:

1. Document the successes and lessons learned from the event
2. Evaluate and understand the complex response activities that the multitude of local and federal agencies made in the first twelve hours after the crash



3. Set the stage for possible revision of manuals, policies, and procedures as needed in response to the lessons learned
4. Improve existing training and/or implement new training to ensure SFO is as prepared as possible for future incidents

## Approach and Design

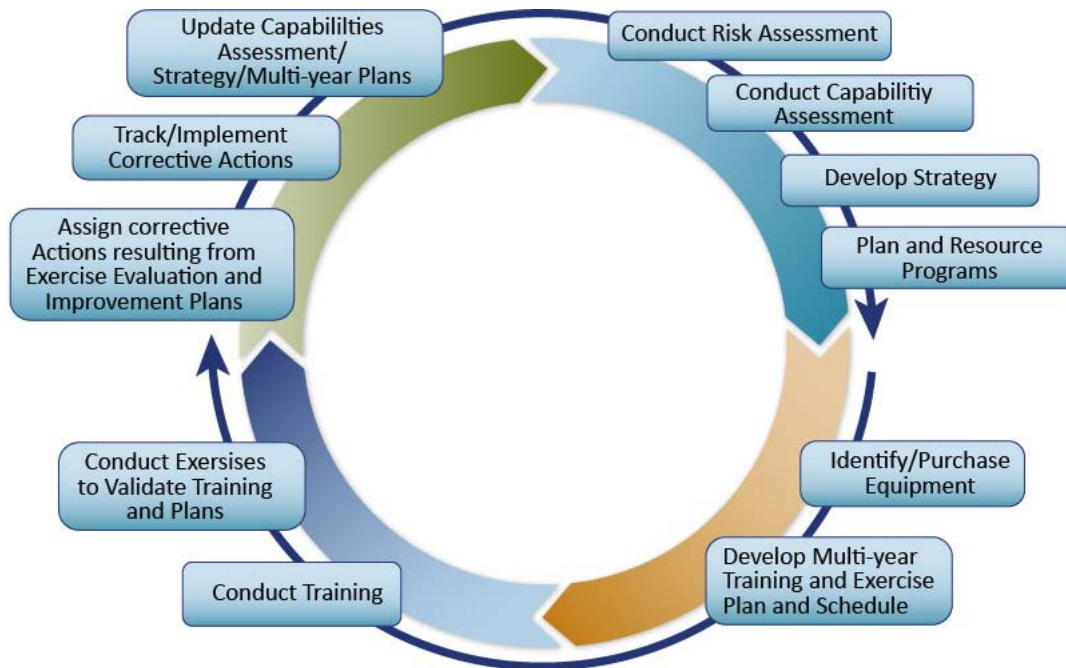
Debriefs were structured similar to the techniques used for capturing participant observations as part of the [Homeland Security Exercise and Evaluation Program \(HSEEP\)](#).<sup>8</sup> The HSEEP methodology provides a universally accepted set of principles and a common approach to evaluation and improvement that offers stakeholders an opportunity to assess and validate capabilities, shape planning, and address any gaps identified. The debriefs were organized using [National Preparedness Goal \(NPG\)](#)<sup>9</sup> mission areas and Public Health Preparedness Capabilities across three components of the incident – Response, Recovery, and Medical Surge and Family Assistance. The debriefs were then divided by phases or activities in order of their occurrence and, using relevant NPG core capabilities and the [National Incident Management System \(NIMS\)](#)<sup>10</sup> as a framework, participants were able to highlight specific best practices and lessons learned requiring further consideration. Discussion items were then recorded for inclusion in this report.

The NPG defines what it means for the whole community<sup>11</sup> to be prepared for all types of disasters and emergencies. NIMS identifies concepts and principles that address management of emergencies in all mission areas regardless of cause, size, location, or complexity and provides a consistent, nationwide approach and vocabulary for multiple agencies or jurisdictions to work together to build, sustain, and deliver the NPG core capabilities needed to achieve a secure and resilient entity, state, and nation.

The identification and development of best practices and lessons learned are essential to SFO's implementation of the [Preparedness Cycle](#)<sup>12</sup> (Figure 3). NIMS defines preparedness as "a continuous cycle of planning, organizing, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response."<sup>13</sup> The Preparedness Cycle allows agencies to take ownership of and better manage corrective action in an effort to be ever more effective during an emergency incident. The NPG core capabilities of operational communication, intelligence and information sharing, planning, mutual aid coordination, public and private services, and resource management are complex and require a comprehensive and coordinated approach that is multi-disciplinary and cross-jurisdictional. Although some of the lessons learned identified during the debrief sessions are unique to SFO, most of the remaining issues are common challenges throughout the emergency management community and will require a coordinated response on the part of SFO and its airline and public safety partners.

To encourage the broadest participation and involvement of the airport community in the debrief series, and to achieve the multi-disciplinary and cross-jurisdictional engagement needed for continuous improvement, SFO senior leadership held a kick-off breakfast to acknowledge the efforts and successes of those involved in the response and recovery efforts for Asiana 214. The breakfast was also an opportunity to introduce the intent and structure of the debriefs and informally converse about

personal experiences and perspectives on the incident. The collegial environment of the breakfast set the tone for the openness and collaboration that was so vital to the success of the entire debrief series.



**Figure 3. Preparedness Cycle**

Following the breakfast, select agencies and personnel were invited to participate in two 8-hour debriefs focused on the response and recovery efforts that occurred during the first 12 hours following the crash. Prior to attending the debriefs, participants were requested to review existing plans and document their recollection of key actions taken during the incident to prepare themselves to openly share and discuss their observations with others and reconcile their collective understanding of what went well and what may need improvement. Such advance preparation allowed attendees to quickly identify and concur on best practices and lessons learned, as well as generate initial recommendations. The success of the debriefs was greatly aided by the forward-looking, collegial, and non-attribution atmosphere created by SFO leadership and the debrief participants themselves.

During the Response Debrief, use of the NPG core capabilities focused discussions around areas of airfield operations, fire, law enforcement, public health preparedness/emergency medical services, and emergency management. The Recovery Debrief adopted the same approach and format the following day. The Recovery Debrief focused on the activities that occurred between July 6, when the National Transportation Safety Board (NTSB) arrived and assumed control of the crash scene in coordination with law enforcement, and July 12, when the impacted runway (28L) reopened ahead of schedule. Using applicable core capabilities, the facilitator guided Recovery Debrief attendees through a discussion of actions taken to transition from the response phase (including the preparation of the incident scene for the NTSB) to the reopening of the runway.



The final debrief had a smaller participant group and placed special focus on medical response efforts and family assistance/reunification. The Medical Surge and Family Assistance Debrief used Public Health and Healthcare System Preparedness capabilities to guide attendees in the analysis of targeted topics of discussion such as response protocols, triage, mutual aid from San Mateo and San Francisco counties, hospital support and coordination, medical transport, and family assistance and reunification.

Participants understood that the lessons learned during the debrief series would not only be used to further the development of SFO's own emergency preparedness program and that of others across the airport community, but could also have broader ramifications outside of that community. Given its experience during the Asiana 214 incident, airport executives appreciated the fact that the larger and/or more general insights obtained during the debriefs could be of value in improving the response and recovery capabilities of its public safety and emergency medical services partners across the region, as well as at airports across the nation. Accordingly, SFO executive management intends to share the findings and recommendations contained in this report as broadly as possible.

## Core Capabilities and Priorities

The NPG has identified 31 core capabilities to frame the critical elements needed to execute the five mission areas of Prevention, Protection, Mitigation, Response, and Recovery. These core capabilities are broadly applied to multiple functions within the emergency management field and are not limited strictly to the descriptions provided. For example, Mass Care is defined and interpreted dozens of ways in different settings, but within the NPG, Mass Care is defined as: Provide life-sustaining services to the affected population with a focus on hydration, feeding, and sheltering to those who have the most need, as well as support for reunifying families. In debriefing the Asiana 214 incident, all of the efforts



taken to care for the needs of surviving passengers were generally categorized as Mass Care; this included hydration, feeding, clothing, sheltering, mental and behavioral assistance/support, family reunification, and any assistance provided to the family members of passengers.

So while the core capabilities and public health priorities as defined elsewhere do not perfectly align with SFO's response and recovery efforts, it is not uncommon to adapt these standard definitions to provide a more appropriate incident-specific framework for after action debriefing and reporting.

The following presents a detailed review of the NPG mission areas, core capabilities, and priorities that were selected to guide discussions and elicit and capture content from the participants during the debriefs. These mission areas and core capabilities were applied as a simple framework to guide the facilitated discussions. They were not applied as explicit evaluation criteria. Given the purpose and objectives of the *Beyond Asiana 214 – Moving Forward Together* debrief series, there was also not any intent to conduct a thorough examination of all response and recovery actions related to the Asiana 214 incident itself. Such critiques are better accomplished by the responding agencies themselves.

## Response

The NPG Response mission area includes those capabilities necessary to save lives, protect property and the environment, and meet basic human needs after an incident has occurred. This mission area is focused on ensuring that the affected community is able to effectively respond to any threat or hazard, including those with cascading effects, with an emphasis on saving and sustaining lives and stabilizing the incident. It also focuses on rapidly meeting basic human needs, restoring basic services and community functionality, establishing a safe and secure environment, and supporting the transition to recovery.

Response Area Core Capabilities
<b>Environmental Response/Health and Safety:</b> Ensure the availability of guidance and resources to address all hazards including hazardous materials, acts of terrorism, and natural disasters in support of the responder operations and the affected communities.
<b>Care for the Deceased:</b> Provide Care for the Deceased services, including body recovery and victim identification, working with state and local authorities to provide temporary mortuary solutions, sharing information with mass care services for the purpose of reunifying family members and caregivers with missing persons/remains, and providing counseling to the bereaved.
<b>Infrastructure Systems:</b> Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.
<b>Mass Care:</b> Provide life-sustaining services to the affected population with a focus on hydration, feeding, and sheltering to those who have the most need, as well as support for reunifying families.
<b>On-Site Security and Protection:</b> Ensure a safe and secure environment through law enforcement and related security and protection operations for people and communities located within affected areas and also for all traditional and atypical response personnel engaged in lifesaving and life-sustaining operations.
<b>Operational Communications:</b> Ensure the capacity for timely communications in support of security, situational awareness, and operations by any and all means available, among and between affected communities in the impact area and all response forces.
<b>Operational Coordination:</b> Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.

Response Area Core Capabilities
<b>Public Health and Medical Services:</b> Provide lifesaving medical treatment via emergency medical services and related operations and avoid additional disease and injury by providing targeted public health and medical support and products to all people in need within the affected area.
<b>Public Information and Warning:</b> Deliver coordinated, prompt, reliable, and actionable information to the whole community through the use of clear, consistent, accessible, and culturally and linguistically appropriate methods to effectively relay information regarding any threat or hazard and, as appropriate, the actions being taken and the assistance being made available.
<b>Situational Assessment:</b> Provide all decision makers with decision-relevant information regarding the nature and extent of the hazard, any cascading effects, and the status of the response.

## Recovery

The NPG Recovery mission area follows Response and includes those capabilities necessary to assist communities affected by an incident to return to normalcy. This mission area is focused on a timely restoration, strengthening, and revitalization of infrastructure; housing; a sustainable economy; and the health, social, cultural, historic, and environmental fabric of communities impacted by a catastrophic incident. The ability of a community to accelerate the recovery process begins with its efforts in pre-disaster preparedness, including mitigation and planning and building capacity for disaster recovery. These efforts result in a more resilient community with an improved ability to withstand, respond to, and recover from disasters, with an associated reduction in loss of life, recovery time, and cost.

Recovery Area Capabilities
<b>Economic Recovery:</b> Return economic and business activities (including food and agriculture) to a healthy state and develop new business and employment opportunities that result in a sustainable and economically viable community.
<b>Health and Social Services:</b> Restore and improve health and social services networks to promote the resilience, independence, health (including behavioral health), and well-being of the whole community.
<b>Infrastructure Systems:</b> Stabilize critical infrastructure functions, minimize health and safety threats, and efficiently restore and revitalize systems and services to support a viable, resilient community.
<b>Natural and Cultural Resources :</b> Protect natural and cultural resources and historic properties through appropriate planning, mitigation, response, and recovery actions to preserve, conserve, rehabilitate, and restore them consistent with post-disaster community priorities and best practices and in compliance with appropriate environmental and historical preservation laws and executive orders.
<b>Operational Coordination:</b> Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.
<b>Planning:</b> Conduct a systematic process engaging the whole community as appropriate in the development of executable strategic, operational, and/or community-based approaches to meet defined objectives.

Recovery Area Capabilities
<b>Public Information and Warning:</b> Deliver coordinated, prompt, reliable, and actionable information to the whole community through the use of clear, consistent, accessible, and culturally and linguistically appropriate methods to effectively relay information regarding any threat or hazard and, as appropriate, the actions being taken and the assistance being made available.

## Public Health and Healthcare Preparedness

Under the NPG core capabilities, Public Health and Medical Services are represented as a response capability; however public health and medical preparedness cut across all mission areas. In an effort to provide state and local health departments and the healthcare system with direction and guidance in how to execute requirements beyond NPG core capabilities, the Department of Health and Human Services, through its Office of the Assistant Secretary for Preparedness and Response (ASPR) Hospital Preparedness Program (HPP) and the Centers for Disease Control and Prevention (CDC) Public Health Emergency Preparedness (PHEP) issued additional guidance that addresses Public Health Preparedness Capabilities and Healthcare System Preparedness Capabilities. The following eight capabilities have been selected here as the most relevant to a mass casualty incident like Asiana 214.

Public Health and Healthcare Preparedness Capabilities
<b>Emergency Public Information and Warning:</b> Emergency public information and warning is the ability to develop, coordinate, and disseminate information, alerts, warnings, and notifications to the public and incident management responders.
<b>Fatality Management:</b> Fatality management is the ability to coordinate with other organizations (e.g., law enforcement, healthcare, emergency management, and medical examiner/coroner) to ensure the proper recovery, handling, identification, transportation, tracking, storage, and disposal of human remains and personal effects; certify cause of death; and facilitate access to mental/ behavioral health services to the family members, responders, and survivors of an incident.
<b>Healthcare System and Community Recovery:</b> Community recovery is the ability to collaborate with community partners, (e.g., healthcare organizations, business, education, and emergency management) to plan and advocate for the rebuilding of public health, medical, and mental/ behavioral health systems to at least a level of functioning comparable to pre-incident levels, and improved levels where possible.
<b>Emergency Operations Coordination:</b> Emergency operations coordination is the ability to direct and support an event or incident with public health or medical implications by establishing a standardized, scalable system of oversight, organization, and supervision consistent with jurisdictional standards and practices and with NIMS.
<b>Information Sharing:</b> Information sharing is the ability to conduct multijurisdictional, multidisciplinary exchange of health-related information and situational awareness data among federal, state, local, territorial, and tribal levels of government, and the private sector. This capability includes the routine sharing of information as well as issuing of public health alerts to federal, state, local, territorial, and tribal levels of government and the private sector in preparation for, and in response to, events or incidents of public health significance.

Public Health and Healthcare Preparedness Capabilities
<p><b>Mass Care:</b> Mass care is the ability to coordinate with partner agencies to address the public health, medical, and mental/ behavioral health needs of those impacted by an incident at a congregate location. This capability includes the coordination of ongoing surveillance and assessment to ensure that health needs continue to be met as the incident evolves.</p>
<p><b>Medical Surge:</b> Medical surge is the ability to provide adequate medical evaluation and care during events that exceed the limits of the normal medical infrastructure of an affected community. It encompasses the ability of the healthcare system to survive a hazard impact and maintain or rapidly recover operations that were compromised.</p>
<p><b>Responder Health and Safety:</b> The responder safety and health capability describes the ability to protect public health agency staff responding to an incident and the ability to support the health and safety needs of hospital and medical facility personnel, if requested.</p>
<p><b>Volunteer Management:</b> Volunteer management is the ability to coordinate the identification, recruitment, registration, credential verification, training, and engagement of volunteers to support the jurisdictional public health agency’s response to incidents of public health significance.</p>

## Kick Off Breakfast Summary

On July 30, 2013, SFO senior leadership conducted a Kick Off Breakfast to introduce the debrief series and to encourage the widest possible participation. The theme of the series *Beyond Asiana 214 – Moving Forward Together* exemplified the forward-looking, collegial, and non-attribution atmosphere desired during the breakfast and set the stage for the entire debrief series that was to follow. Positive, uplifting, and yet candid remarks from SFO leadership, senior officials from the various first responder agencies, and other airport partners gave life to the SFO core values of mutual respect, openness, shared responsibility, and pride. Following these remarks, attendees were invited to break up into cross-jurisdictional and interdisciplinary groups to discuss how the Asiana 214 incident affected them both personally and professionally.

Group discussions during the Kick Off Breakfast were not limited to the simple mechanics of response and recovery activities during the incident, but also included how the emergency affected the participants emotionally -- what they felt about what occurred and what they learned about themselves and those they work with. As participants were sharing their personal perspectives, a spokesperson for each group captured related thoughts, emotions, and common themes. Senior leadership from the airport and supporting public safety agencies circulated around the room and visited with each group where they listened intently to the exchange, shared their own personal stories, and thanked people for their service and contribution to a highly successful response and recovery effort. After group discussions concluded, a spokesperson shared the information collected during a final plenary session.

The stories shared were candid, profound, and powerfully moving. As such, the Kick Off Breakfast did much to help move forward the process of collective healing and candid reflection. Introducing the debrief series in this type of collegial environment also did much to set the tone for a high level of active participation in the work to come and encouraged attendees to further commit themselves to the overall goal of improving the capability of the SFO community to more effectively handle incidents of this type in the future.

## Plenary Speakers

- John Martin, SFO Airport Director
- Tryg McCoy, SFO Chief Operating Officer
- Deputy Chief Denise Schmitt, San Francisco Police Department (SFPD), Airport Bureau (AB)
- Assistant Deputy Chief Dale Carnes, San Francisco Fire Department (SFFD), Airport Division
- Peter Acton, SFO Facilities Director
- Kandace Bender, SFO Deputy Director Communications & Marketing
- Jeff Littlefield, SFO Deputy Director Operations & Security
- Tom Kinton, ICF SH&E Senior Advisor and former Chief Executive Officer, Massport



## Response Debrief Summary

On August 7, 2013, a facilitated debrief focused on response was conducted to further develop a chronology of events; capture lessons learned and promote best practices; address gaps in capabilities and identify recommendations for refinement of SFO and agency plans; and overall build an stronger emergency response team. The efforts of first responders and airport personnel in dealing with Asiana 214 were extraordinary and there were a number of successes noted throughout the response phase. However, many areas requiring improvement were noted as well. As cited previously, the identification



and development of best practices and lessons learned are essential to SFO's implementation of the Preparedness Cycle and continuous improvement in emergency response capabilities.

As reflected in the following 12 specific observations, a thorough analysis of debrief discussions revealed best practices and lessons learned related to operational communications, information sharing, incident command, planning, and resource management. These core capabilities are

complex and require a comprehensive and coordinated improvement plan and implementation effort. To be effective, that effort must be multi-disciplinary and include a wide variety of SFO partner agencies and jurisdictions. Each observation, drawn from the daylong facilitated debrief, has a specific recommendation or set of recommendations for continued improvement based on established emergency management doctrine, best practices, and the experience and expertise of the participants.

## Participating Organizations

- Airports Council International - North America (ACI-NA)
- Airfield Operations
- Airport Communications
- Airport Duty Managers
- Airport Landside Operations
- American Medical Response (AMR)
- American Red Cross (ARC)
- Asiana Airlines
- California Office of Emergency Services (CAL-OES)
- Federal Aviation Administration (FAA)
- Federal Bureau of Investigation (FBI)
- San Francisco County Emergency Medical Services (EMS)
- San Francisco County Department of Emergency Management (DEM)
- San Mateo County Mutual Aid
- San Mateo County EMS
- San Mateo County OES
- SFFD
- SFPD
- Transportation Security Administration (TSA)
- U.S. Customs Border Protection (CBP)
- United Airlines

## Best Practices and Lessons Learned

### Observation 1: Emergency Alert and Notification Systems

**A highly reliable emergency alert and mass notification system is essential to the speedy and effective mobilization of emergency responders and ongoing communication with survivors and other impacted individuals throughout a crisis.**

Timely and relevant communication throughout the lifecycle of an event can enable a more effective overall response. Commercial airports are complex systems involving arriving and departing aircraft, the circulation of thousands of passengers and airport workers, and the movement of numerous ground vehicles on taxiways and surrounding roadways. This system is managed by an intricate ballet of airlines, contractors, public safety agencies, concessionaires, and airport staff, all working within a larger community of businesses, residential neighborhoods, schools, and other infrastructure. The ability to manage a major emergency and efforts to limit the extent of its impact depend greatly on communication among the entire population of the airport and the community it supports.

In a fast moving incident, SFO's response efforts must immediately seek to minimize injury and loss of life, protect valuable property and systems, and limit the impact and expansion of the emergency. The response process begins when SFO rapidly alerts and informs first responders (e.g., police, fire, emergency medical services, trauma facilities) about the nature, location, and scope of an unfolding incident, as well as those in the immediate chain of command for these first responder agencies. Any delay or miscommunication in alert and notification could cause confusion and the misallocation of resources in the critical early stages of the response.



In an Alert 3 response (i.e., zero forewarning; the incident has occurred) such as Asiana 214, the potential for a large number of casualties and the involvement of other loaded aircraft or crowded terminal facilities is real. SFO uses an internet-based automated messaging service intended for customer, public safety, and disaster alert notifications, but it failed to function properly during this incident. The failure of the system caused delays in notification and limited its use in subsequent phases of the response. Immediately following Asiana 214, airport personnel responsible for the system experienced various problems in accessing the system and discovered that many of the alert contacts in the system's directory were missing subsequent to a recent vendor updating of the software. Airport personnel had to fall back on notification by making individual calls via a phone tree or call-down list - a slow, manual, and, in a large-scale emergency, potentially fault-prone process.



The challenges described above bring into question the functionality of the system and the quality of vendor support. It also indicates that the system may not have been fully maintained through a routine program of testing, training, and exercises conducted by airport staff experienced in its maintenance and use. According to airport management, a combination of known system capacity and capability issues and airport personnel's lack of familiarity with the categorization, labeling, and priority setting of address groups during an Alert 3 contributed to the problems experienced.

Notwithstanding the problems described above, there was no indication from debrief participants that these problems impacted the overall effectiveness of the collective response to the incident.

**Recommendation: Acquire a new alert and mass notification system that is robust, compatible with regional systems, and meets SFO requirements for informing both first responders and key individuals across the airport community.**

In May 2013, and well before the Asiana 214 incident, SFO had already begun to engage vendors in its search for an alternative alert and mass notification system. Such systems have undergone a radical evolution since the attacks of 9/11, Hurricanes Katrina and Rita, and the shootings at Virginia Tech. There are a wide range of new systems, functions, and technology available. As SFO reviews the capabilities of these new systems, it will be important to first conduct a thorough needs analysis, compare leading systems and their performance in real-world incidents, and assess implementation and maintenance costs to select the system that best meets the airport's requirements. Asiana 214 demonstrated that one key criterion for the selection of any such system is how it performs under surges in communications demand. Other criteria include speed of message delivery, alternative delivery paths, successful delivery rate, scalability, ease of use and upkeep, cyber security, and performance during electrical power and/or Internet outages. Some examples of mass notifications systems SFO may include in its comparative analysis of candidate replacements are: [Send Word Now](#),<sup>14</sup> [Everbridge](#),<sup>15</sup> [Enera](#),<sup>16</sup> [AtHoc](#),<sup>17</sup> [Desk Top Alert](#),<sup>18</sup> [mir3](#),<sup>19</sup> [Rave Alert](#),<sup>20</sup> [Omnilert](#),<sup>21</sup> and [Nixle](#).<sup>22</sup>

As SFO considers its own response to the challenge of rapid alert and notification, it should collaborate with regional public safety communications and alert and mass notification working groups to leverage their expertise and ensure appropriate regional compatibility and integration. In addition to regional integration, SFO, should also explore coordinated implementation under the Federal Emergency Management Agency (FEMA) sponsored [Integrated Public Alert and Warning System \(IPAWS\)](#).<sup>23</sup> IPAWS is a national alert network that can be integrated with compatible local systems to notify the public about serious emergencies. Efforts to advance coordinated public information programs are being addressed through the ongoing implementation of the [Bay Area Emergency Public Information and Warning Strategic Plan](#)<sup>24</sup> which is intended to integrate, sustain, and enhance the collective alert and notification capabilities of agencies across the region.

Alerting the general public and keeping the surrounding community informed about the nature of an emergency and what is being done in response helps those impacted make more informed decisions. Effective alerts also help shape public behavior in a way that better enables the response and allows the local community to take preventative measures that will mitigate the cascading effects or expansion of the incident.

## Observation 2: Alert Information and Situation Reporting

**Consistent, clear, concise, and accurate alert information facilitates initial response mobilization and the ongoing incident reporting necessary for situational awareness and overall incident command.**

The means and timeliness of information exchange are only as good as the quality and relevance of the information delivered, regardless of whether that information is provided to the public or to first responders. It is vital that officials observing the scene of an emergency can accurately assess, organize, and transmit what they know in a manner that allows such information to be quickly compiled with information from other sources. This rapid assessment and compilation is a critical starting point for assembling a larger understanding of the situation and is the basis of making crucial response decisions. This is especially true of the initial reports of an emergency and the transmission of an initial alert to first responder agencies. Situational awareness based on accurate and periodic reporting assists responding agencies in rapidly and effectively mobilizing and employing assets. Responding agencies rely upon these observations and alerts to allocate the right lifesaving resources to the right place at the right time.

The merging of information from various sources to create shared situational awareness results in a common operating picture of the event. This common operating picture becomes the basis of coordinated action across agencies, organizations, and jurisdictions within the ICS framework. With this shared understanding, agencies and organizations can identify issues and requirements, establish priorities and decide the allocation of resources, and better manage the overall emergency to achieve operational objectives.

To ensure that the right information is shared in the heat of a crisis, Essential Elements of Information (EEl)s and Critical Information Requirements (CIRs) are often pre-established and formatted for ease of reference. These help to ensure that the most vital information is captured, reported, assessed, combined, and presented in a logical and uniform way. EEl)s are defined as the “who, what, why, where, and when” of emergency response and represent information that contributes to situational awareness, requires action, or may cause cascading effects. EEl)s are typically consistent across all incidents. Two commonly used forms for capturing and reporting these EEl)s are the Spot Reports (SPOTREP) and Situation Reports (SITREP). Adapted from the military, these reports have been adopted by the emergency management community and are in almost universal use across the country. CIRs are established by incident command and general staff and are specific to the incident. These items are so critical that leaders are notified immediately when an update to a CIR is received.<sup>25</sup>

Upon observing the crash of Asiana 214, an FAA tower controller promptly made the initial Alert 3 notification that was then broadcast to the airport crash fire rescue unit, other airport partners, and emergency response agencies. Once the Alert 3 was transmitted and the airport closed to all air traffic, the FAA tower controllers correctly turned their attention to a secondary emergency, the need to safely redirect approaching aircraft to alternative destinations. Unfortunately, according to some debrief participants, the first Alert 3 communication did not immediately provide essential details about the aircraft and nature of the crash. Compounding the lack of essential details within the Alert 3 communication, the failure of the airport’s existing alert and mass notification system meant that

some first responders never received any direct alert or notification and were dependent upon secondhand and unconfirmed information to guide their response decisions.

**Recommendation: All SFO personnel responsible for initiating an Alert 3 communication should be trained on standard formats and protocols and contributing to SPOTREPs and SITREPs.**

Experience from Asiana 214 and lessons learned from other incidents at SFO and elsewhere should be considered in developing a standard format for an Alert 3 crash notification. This format should be incorporated into SFO response plans and training. It should include what information should be transmitted (e.g., EELs), to whom it should be transmitted (list of entities), in what form, and by what mechanism (alert mass notification system, call down list, red phone, etc.). It is also suggested that SPOTREP and SITREP protocols be adopted for use at SFO to facilitate ongoing incident command.<sup>26</sup>

SPOTREPs are flexible and can be tailored to suit specific operational needs, but generally include the date and time of the event; its location, type or nature; a narrative with supplemental information such as causal factors; immediate actions suggested; and the originator's name and contact information. An ICS Form 201 is often used as a SPOTREP to notify Incident Command of EELs or CIRs in between SITREPs. SITREPs are more formal and are developed at the end of each operational period. An [ICS Form 209](#)<sup>27</sup> has a prescribed format and is more often than not employed in larger events of longer duration. Training airport public safety and airfield operations personnel in the use of SPOTREPs and SITREPs will assist the incident commander in the speedy size-up of an emergency, enable a more rapid and coordinated response throughout the incident, and smooth the transfer of command as the incident command structure evolves.

### Observation 3: Emergency Communications Interoperability

**A robust communications plan and the use of common and/or compatible communications platforms for incident command provide a means to help achieve unity of effort across a widely diverse set of responding organizations.**

Incompatibility of radio systems is a common problem facing first responder agencies. These radio systems are often incompatible because they operate on different frequency bands, which prevents responders from talking directly to each other when responding to the same incident. Even if agencies use the same frequencies, radio equipment and trunking systems from different manufacturers can compound the problem. The result of these incompatibilities is that messages are relayed from one communications center to another and then back to their respective units. Precious time is then lost as responders resort to slow and inefficient non-radio means of coordination.

To date, short of fully interoperable systems on a regional scale, some solutions to these incompatibilities have been the sharing of radio equipment caches during emergencies, the use of one or more mutual aid frequencies or talk-groups for interagency incident command, and/or the integration of digital patching equipment to bridge one network to another along with the development and use of a robust communications plan to manage limited radio spectrum and assets.

While the sharing of equipment and radio spectrum within a multi-agency communications plan may suffice for routine emergencies, the increased scope and complexity of a major incident also increases

the communications challenge. That challenge has received significant national attention and funding for programs like California's [Statewide Communication Interoperability Plan \(SCIP\)](#).<sup>28</sup> More importantly with regard to SFO, the [Bay Area Regional Interoperable Communications System \(BayRICS\)](#)<sup>29</sup> has been formed to manage funding and oversight for the BayWEB project and other regional communications efforts aimed at interoperability. BayWEB is a regional data communications network intended to allow public safety officials throughout the Bay Area to communicate voice, data, and video seamlessly both during an incident response and for day-to-day operations.

San Francisco currently employs several different land mobile radio systems in support of its various departments. Its primary public safety radio network is the 800 MHz Citywide Emergency Radio System (CERS), initially installed in 2000. Although it underwent a major upgrade in 2009, the network is now considered to be outdated, too expensive to maintain, and does not fully meet current national interoperability standards; thus, it is in significant need of replacement. San Francisco has just acquired a consultant to assess its land mobile radio needs and is intent on pursuing an upgrade of CERS as a priority. San Mateo County has over the past several years been making steady investments in and is nearing completion of a county-wide 700 MHz trunked public safety radio network – the San Mateo Interoperable Radio Communications (SMIRC) system.

Although a department of the City and County of San Francisco, SFO lies within San Mateo County. In 2010, SFO invested nearly \$7.0 million in the replacement of its old 800 MHz radios with a new 700MHz trunked and encrypted system to support San Francisco Police and Fire department units assigned to the airport along with SFO operations and maintenance personnel. The new system is compatible with the 700 MHz network implemented by San Mateo County, is controlled from the SFO dispatch center, and supports roughly 1,000 handheld and mobile radios across the airport.

Despite SFO's investment in its 700 MHz system, during the response to Asiana Flight 214, incident command communications largely resided on the City and County of San Francisco's 800 MHz CERS. By switching to a pre-designated CERS trunked system talk-group, the Incident Commander achieved a basic level of interoperability among agencies responding from other jurisdictions with which San Francisco maintains a habitual relationship. However, as a result of being confined to the limitations of the outdated 800 MHz CERS, the full interoperability potential of the investment made by SFO and San Mateo in their 700 MHz systems may not have been fully realized. That potential may have been more critical in a more complex and long-term emergency.

It should be noted that a number of the issues identified by debrief participants dealt with information sharing and perceived challenges to effective communications among agencies during response operations. Even though discussed in the context of communications, some of those issues seemed to relate more to responder behavior and operational practices than to technology. For example, less-than-full employment of the ICS and the absence of key responding assets (i.e., Airfield Safety Officers [ASOs]) within the ICS likely limited the incident commander's ability to effectively communicate with key response personnel. However, those operational issues may have been offset somewhat by the use of more common and/or compatible communications platforms to enable more rapid coordination of interagency and cross-jurisdictional response efforts.

Although the SFO Emergency Procedures Manual (EPM) has a section on communications, it does not clearly lay out anticipated information flows across the ICS organization. It also does not present a communications plan matrix to match communications frequencies to that ICS organization or those information flows. Even though responders compensated for the lack of a well-defined communications plan with direct face-to-face contact, if the crisis had been more complex or widespread, incident command communications may have been stretched beyond its limits.

**Recommendation: Develop a Communications Plan Annex to the Emergency Procedures Manual that implements radio system interoperability protocols and/or frequency sharing arrangements to strengthen effective interagency coordination.**

Although SFO and San Mateo County have made investments in new interoperable communications, the realization of the full potential of those investments will not be achieved until surrounding jurisdictions implement compatible systems and practices. While advances toward interoperability continue across the region, there is an interim need for common approaches and interagency agreements that accommodate differences in systems and facilitate the integration of older radio equipment used by SFO's mutual aid partners. All of these should be within the framework of the incident command protocols and information flows in the SFO Emergency Procedures Manual.

A Communications Plan Annex can establish a matrix of radio frequencies against responding agencies and incident command functions to allow shared use by authorized and appropriately equipped response entities (i.e., SFPD, SFFD, ASOs, FAA, SFO EOC). This may require the acquisition or sharing of common radio equipment and/or the continued patching or bridging of systems and use of common mutual aid frequencies until systems have been updated and become interoperable. These pre-identified frequencies for core response assets and functions would be based on a set of notional incident command structures for an Alert 3 incident outlined in the EPM.

Pre-planning communications would relieve some of the information sharing issues identified during this incident and limit the opportunity for confusion and delay when time matters most. It is further suggested that SFO seek the assistance of regional public safety interoperable communications working groups to obtain their expertise and assistance in implementing a revised EPM

Communications Plan Annex. SFO should work with the BayRICS community to integrate its long-term communications planning with the BayWEB project, so that SFO can both benefit from this advanced communications network and better share its own information (voice, data, and video) with regional public safety and emergency management agencies essential to any airport incident.

#### **Observation 4: Proactive Communication of On-Scene Information**

**The timely and disciplined exchange of information among first responders assists in rapid situational awareness, facilitates organization and employment of response assets, and strengthens incident command decision-making.**

The exchange and integration of information from a variety of sources is essential to achieving rapid situational awareness. Responders must size-up an emergency, develop a shared understanding of its nature, establish joint priorities and objectives, and employ all responding assets in a coordinated and effective way to achieve shared objectives under a unified ICS framework. The importance of this

exchange of information continues from initial alert and the early phases of response throughout demobilization and into recovery.<sup>30</sup>

To manage the convergence of a diverse set of responders from both public safety and civilian agencies, the ICS depends on agencies concurring with unified command and interagency collaboration. However, organizational and social factors may prevent even the simplest sharing of information needed to achieve shared situational awareness. Emergencies can place responders under unimaginable stress, often causing them to mentally narrow their focus on doing what they know and migrating toward who they know best – their comfort zone. This cognitive narrowing works against collaboration and reinforces an organizational bias that segregates responders into functional silos and their own information chains. Under extreme stress, they can feel little obligation to share information outside their own group.<sup>31</sup> Furthermore, responders fail to seek out information from outside their own agency and miss out on critical information available from different perspectives.

In a recent paper on [Crisis Leadership](#),<sup>32</sup> Assistant Chief Joseph Pfeifer of the New York City Fire Department identified several factors that can combine to inhibit information sharing across agencies and among key individuals in a response. To some extent, those factors were evident in the response to Asiana 214 and must be addressed to limit their impact in future incidents. Airfield Safety Officers were first on the scene of Asiana 214 and deployed widely around the incident perimeter. As a result, the ASOs had the earliest assessment of conditions at ground level and down the section of the runway where the crash occurred. Moments after arrival of the ASOs, SFFD Aircraft Rescue and Fire-fighting (ARFF) units arrived and formed the nucleus of incident command as other SFO fire, police, and emergency medical assets followed. Upon arrival, there was little immediate exchange of information between SFFD ARFF responders and ASOs to get an appraisal of the debris field or spread of passengers and casualties. It was also apparent that other responders or airport partners who had early bits of information that may have informed situational awareness were likewise not engaged. This seemed to limit the incident commander's field-of-view and hamper informed decision-making.

**Recommendation: SFO response plans, incident command protocols, and training need to reflect the importance of information exchange for shared situational awareness and address any organizational barriers to communication.**

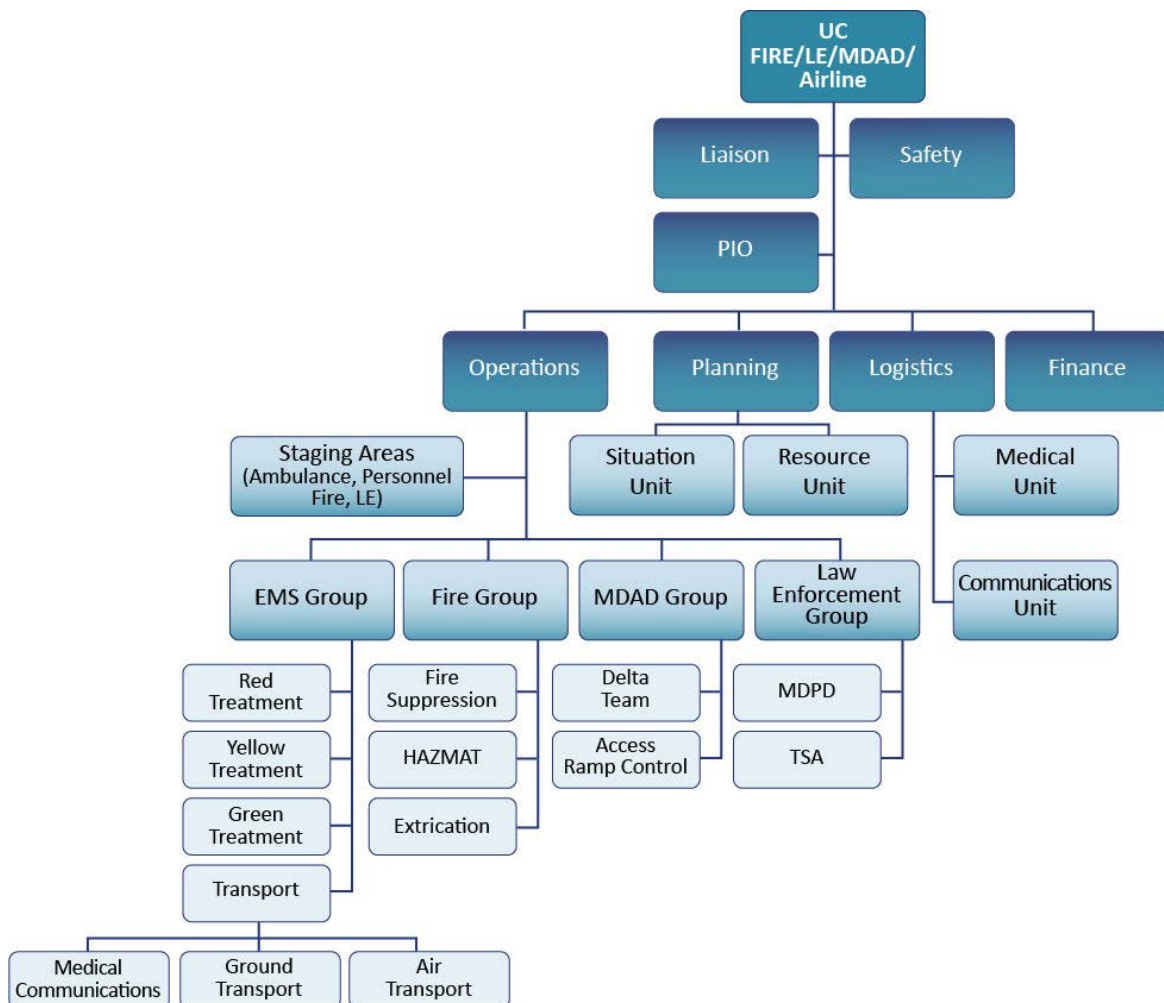
Asiana 214 demonstrated that ASOs will be among the first, if not the first, airport personnel on the scene given their mission and day-to-day operations. Accordingly, ASOs should be recognized by SFO public safety partners as an important enabler to the arriving incident commander in the initial size-up of an emergency and in informing time-sensitive decisions about the positioning and employment of response assets. Furthermore, such information exchange will facilitate the ASO role in deploying SFO incident command support vehicles/equipment, as well as the escort and positioning of mutual aid resources arriving from off-airport. The integration of all sources of situational awareness information should also be considered, such as that from FAA personnel in the airport control tower, from closed-circuit television (CCTV) imagery in the SFO EOC, or from public safety aircraft overhead. SFO plans must include protocols that provide for immediate and complete scene assessments and structures to enable the ongoing sharing of response information. Follow-on training and exercises should incorporate these protocols and include Fire, Police, ASO, and other operations personnel.



## Observation 5: Incident Command System

**If fully employed, the ICS accommodates incident escalation and expansion in span of control and, through the integration of all needed partners, drives unity of effort and best use of available assets.**

When an emergency requires a response from a variety of organizations and functional disciplines, the use of common management processes and systems is vital to effective coordination. ICS is a management system<sup>33</sup> designed to enable effective and efficient command and control by integrating a combination of personnel, facilities, equipment, and communication assets operating within a universal command structure. Developed in the 1970s, ICS has since evolved as a standard, national best practice now employed by first responders, civilian agencies, and private sector organizations across the country to manage multi-agency and multi-jurisdictional disaster response operations. In addition to ICS guidance provided by FEMA, the FAA has adopted these same principles for aircraft incidents to include the notional ICS framework shown in Figure 4.



**Figure 4. Sample Incident Command System for an Aircraft Accident – FAA AC 150/5200-31C**

ICS is predicated on a common set of management principles that guide its application. These principles include unity of command, modular organization, manageable span of control, consolidated incident planning, management by objectives, integrated communications, common terminology, comprehensive resource management, and designated incident facilities. Its structure is scalable and may be expanded and contracted as needed depending on the nature, scope, and complexity of the situation. The principles of unity, modularity, and span of control are reflected in the five major sections of ICS structure, which include Command, Planning, Operations, Logistics, and Finance and Administration.

The principles of consolidated incident planning and management by objectives are achieved through Incident Action Planning and the use of an ICS process known as the Planning “P.”<sup>34</sup> As shown in Figure 5, the Planning “P” is a guide to the steps necessary in planning for an incident from initial response, within the leg of the “P,” to the beginning of the first operational planning period, which is shown as a circular sequence at the top of the “P.”

A single Incident Commander (IC) integrates a diverse set of disciplines into the ICS structure, with the Operations Section being made of up capabilities from those disciplines most directly engaged in the operational tactics of the response and broken down by branches (e.g., fire suppression, law enforcement, emergency medical) and various other subdivisions. Command is typically assigned and transferred based on a combination of factors to include the agency most central to the emergency, the most capable leader present, and the incident priorities at the time.

From remarks made by some debrief participants, it became clear that ICS was not fully implemented in response to Asiana 214. Although there is no indication that lack of full implementation had any notably adverse consequences, in a more severe crisis it is highly likely that the IC would not be well

positioned to manage any escalation of the incident. Escalation would require sufficient establishment of the command structure and critical roles like the Operations Section Chief to ensure an effective span of control as the response organization expanded. Also, by not effectively incorporating other civilian partners into the ICS structure, the IC would not have experienced the full benefit of their expertise or the ability to maximize their contribution.

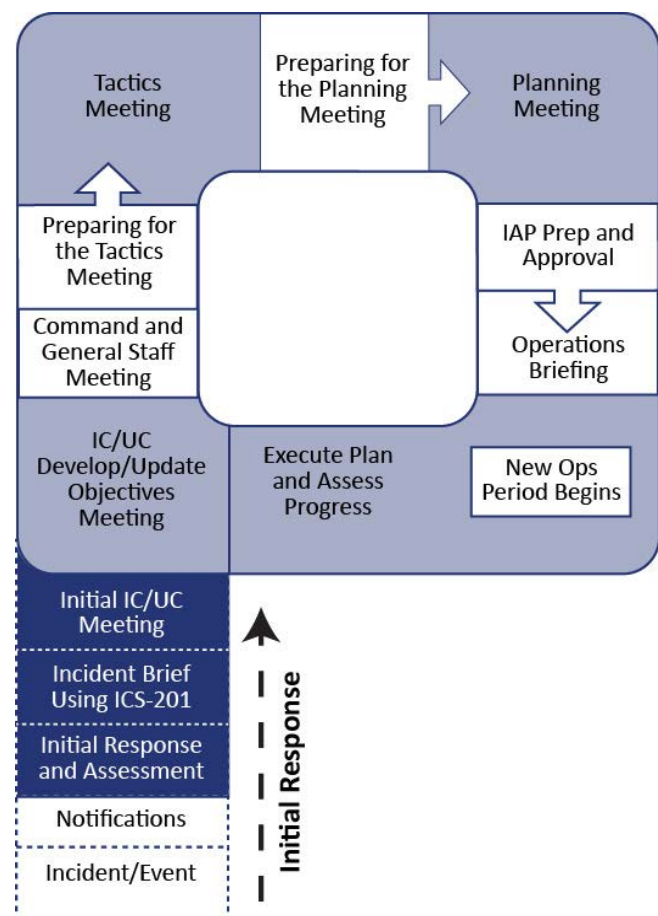


Figure 5. ICS Planning "P"



There is some indication that the initial IC was primarily focused on the immediate tactical operation and lacked an opportunity to step back sufficiently to organize and coordinate the full scope of the multi-agency response. This left some resources like emergency medical services to self-organize until the ICS structure and leadership could catch up. Compounding this issue, the IC role was transferred midstream during the most critical phase of the response to a leader who was more senior but was unfamiliar with airfield and aircraft rescue and firefighting (ARFF) operations and SFO in general.

**Recommendation: Train Incident Commanders and other response leaders in the full application of ICS, to include delegation of key roles, and amend SFO response plans to emphasize inclusion of civilian partners and proper transfer of command.**

SFO response plans should be amended in partnership with its public safety partners to better depict the use of ICS in response operations. Plans can incorporate notional ICS staffing templates for various crisis scenarios and identify appropriate integration of SFO civilian operations, such as engineering, public affairs, and airline operations. Once plans have outlined staffing templates, training and exercises are necessary to reinforce interagency collaboration and the implementation of ICS core management principles. Training curricula for ICS can be found in FEMA's [NIMS Training Program](#)<sup>35</sup> guide.

It is important to recognize that [incident command training](#)<sup>36</sup> and exercises are essential for both senior public safety leaders as well as civilian officials who are integral to the ICS structure at SFO. Exercises should not only simply require the demonstration of basic skills, but also test ICS capabilities, personnel and equipment readiness, and the completeness and functionality of the SFO response plan, under stress, to ensure that any gaps are identified and corrected. ICS training and exercises must also test protocols for the assignment and transfer of IC responsibility and the use of Incident Action Planning by SFO public safety leaders and others within their respective chains of command.

To address a natural tendency for organizational bias under conditions of extreme stress, senior leaders may benefit from advanced crisis leadership training. The [Harvard Kennedy School](#)<sup>37</sup> or the University of Pennsylvania's [Wharton School](#)<sup>38</sup> each offers their own crisis leadership programs. Such training should address how to overcome the potential personal and/or organizational issues that may inhibit free information exchange and how to foster the cross-functional collaboration required in complex emergencies. For senior public safety leaders, more advanced education that fosters multidisciplinary and cross-jurisdictional collaboration can be found at the [Center for Homeland Defense and Security](#)<sup>39</sup> at the Naval Postgraduate School, which is open to civilian agencies.

## Observation 6: Emergency Operations Center

**EOCs are important links in the incident management hierarchy when appropriately implemented within an ICS framework and integrated with the Incident Command Post and other regional EOCs.**

EOCs do not function in a vacuum but rather are part of a larger system of incident management and networked multiagency coordination, with the on-scene Incident Command Post (ICP) at one end and an interconnected web of agency, county, and State operations centers on the other. Most EOCs perform two primary functions:

1. Develop, maintain, and share situational awareness, support executive decision-making, and facilitate interagency communications and public information.
2. Assist the IC and response agencies by acquiring resources, performing overhead tasks better managed away from the incident scene, and coordinating with other partners on issues at the periphery of the emergency and outside the immediate control of the IC.

The more complex the crisis, the more robust EOC staffing and structure become to meet the challenge. Like the use of ICS on scene, the EOC function is scalable and may be activated in part or expanded and contracted as needed. The nation's system of emergency management is based largely on interagency support and mutual aid. Assuming more capable communications than the ICP, and having a strategic view of the crisis, EOCs are a conduit for informing broader situational awareness among external partners, as well as engaging those partners to obtain the additional expertise, support, and resources the incident may require.

While EOCs are often staffed and structured along ICS lines that mirror its application by responders on scene, they do not command on-scene activities. On-scene ICS is organized around *command and control* of incident operations, whereas the EOC is organized for more strategic-level *coordination* through information collection and assessment, interagency liaison, overall goal setting, and resource management. The FAA provides notional guidance on the role of EOCs in aircraft incidents and generally outlines the nature of interaction with Unified Command as shown in Figure 6.

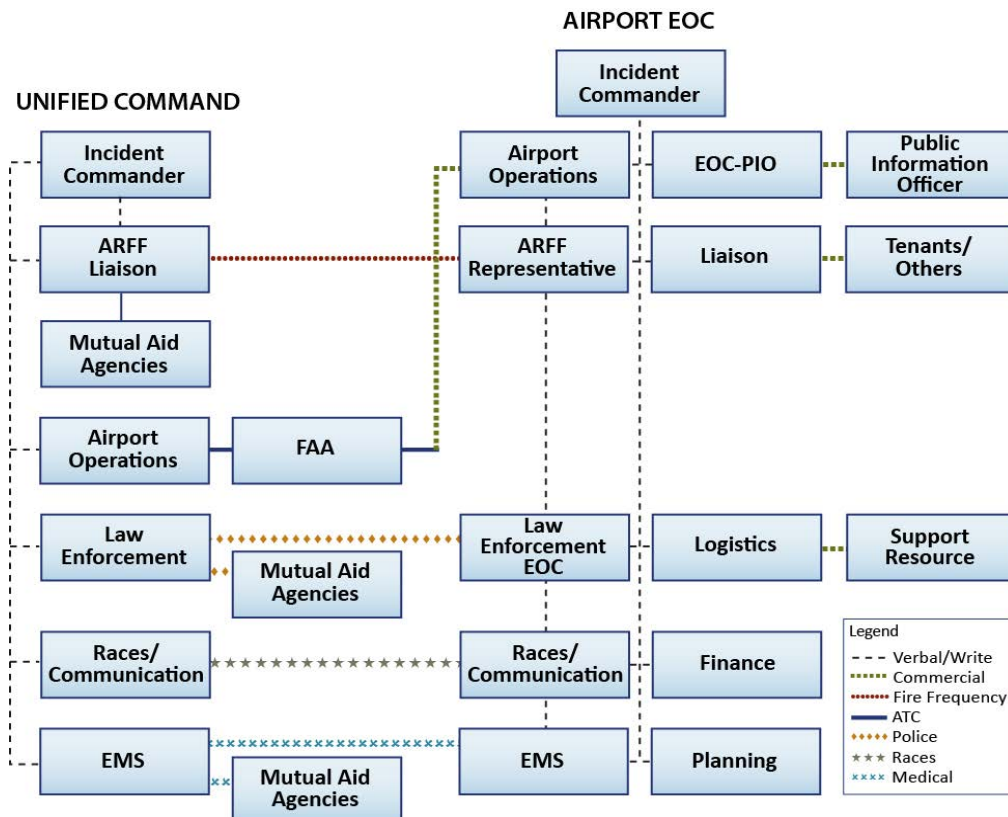


Figure 6. Notional sample of EOC and Unified Command interface

During response to the Asiana 214 incident, personnel located in the EOC were able to work together largely because of ongoing habitual relationships and general familiarity with the facility as a function of prior exercises. However, from a review of the SFO EPM and discussions during the Response Debrief, it became evident that the SFO EOC does not have an adequate concept of operations, the standard operating procedures (SOPs), or the dedicated leadership, staffing, and training necessary to operate effectively in support of on-scene incident response and recovery operations. The impression among key responders was that although the EOC may have served as an information hub following Asiana 214, the EOC function was largely unstructured. As a result, it did not fully realize its potential as an aid to on-scene operations in interagency liaison and resource management or as a facilitator to strategic level situational awareness and executive decision-making through routine and structured operational planning and reporting. There is also a lack of clarity about where SFO's EOC sits within the larger network and hierarchy of regional emergency management and, specifically, its relationship to and interface with San Francisco and San Mateo county emergency management agencies.

**Recommendation: Better define the role of the EOC in SFO incident management and in relationship to San Francisco and San Mateo counties, prepare an EOC SOP supportive of those relationships and processes, and identify and train personnel to fill key EOC positions.**

Just as key tactical leaders need to be trained in ICS to effectively manage multiagency response and recovery operations on scene, it is also important that SFO executive leadership and EOC personnel be trained in ICS and the role and functioning of the EOC. This will enable leadership to fill various positions under the ICS structure in line with a well-established SOP. That SOP should complement the SFO EPM and address the following:

- EOC's mission, concept of operations, and relationship with the larger network of regional emergency management agencies
- Guidance on alerting, activation, and deactivation
- EOC structure, staffing, operational cycles, and core processes (e.g., situation reporting, operational planning, resource management, etc.)
- Responsibilities, desktop procedures, and references associated with each key position
- Guidance on message handling and use of communications and other systems

Both the EPM and the EOC SOP should address the role and composition of the SFO Executive Command Group (ECG) and its relationship to the EOC, as well as the nature of the EOC to ICP interface. Also, it is unlikely that SFO can support having its own personnel trained and ready to fill all necessary positions in the EOC. SFO personnel are already tasked with challenging day-to-day operational roles and cannot be expected to build a high-level of proficiency in ICS and EOC operations at the same time. Thus, SFO should engage its regional emergency management and public safety partners to pre-identify trained personnel who can fill key EOC roles if requested. Local Incident Management Teams (IMTs) may be one approach to staffing the EOC, as they are highly trained personnel experienced in the application of ICS under a variety of incident management scenarios. Lastly, the City and County of San Francisco Emergency Response Plan,<sup>40</sup> the California OES sponsored Bay Area Regional Emergency Coordination Plan,<sup>41</sup> and the California Standardized Emergency

Management System<sup>42</sup> (SEMS) should provide the basis for drafting key elements of the airport EOC SOP as they explain interagency and EOC-to-EOC collaboration concepts and protocols during regional incidents.

## Observation 7: Crisis Management Systems

**Crisis management systems (CMSs) can greatly enable information handling, support shared awareness, facilitate interagency coordination, and strengthen unity of effort toward common objectives.**

In recent years, there has been a growing number of information systems used in support of emergency management incident command and EOC operations. They are labeled as Critical Incident Management Systems, Crisis Information Management Software, or simply CMSs. These tools come in a range of applications with a variety of features, but all generally support the collection and fusion of information for decision-making, provide a platform for shared situational awareness and a common operating picture, support messaging for multiagency coordination, manage resource tracking and requests for support, and serve as a central database for the logging of events and as an incident chronology. If common systems and practices are widely employed, these systems better enable interagency incident management, especially in complex emergencies.

In 2012, FEMA settled on a single vendor to provide its own CMS. That system, WebEOC, is already in use by the State of California, is being implemented statewide and has been adopted across the entire San Francisco Bay Area. The [San Francisco Bay Area Region WebEOC Project](#)<sup>43</sup> was initiated this year and will integrate with existing CMS applications already in place to provide participants with:

- Real-time information sharing
- The ability to enter and view incident information and status boards
- Assignment, tracking, and management of missions
- Receipt and development of situation reports
- Management of incident resources

Given its statewide use and adoption by the Bay Area, WebEOC promises to facilitate coordination among EOCs in the region. Moreover, during large-scale incidents, a common CMS may provide for direct connectivity with State of California and FEMA incident management officials.

Although the SFO EOC uses the airport's CCTV network and has radio communications that permit ongoing monitoring of incident status to help coordinate response activities, it has yet to implement its WebEOC application. Delay in implementation of WebEOC and absence of other systems and procedures to receive and manage the volume of information that can flow during a major emergency may significantly limit the airport's effectiveness in disaster response and recovery. The rapid transmission of information to other agencies and the ability to request, account for, and manage resources from a range of providers could mean the difference between success and failure.

Currently, the SFO EOC is not well connected to other regional EOCs except by telephone and email, which hampers the exchange of critical incident information. In reviewing post-incident records and

during the debrief, it was clear that the EOC lacked adequate ability to document incident events and was not well equipped to account for and track resources on behalf of the ICP. Were a CMS like WebEOC in place and networked with other regional EOCs, it is likely that it would have not only supported the mobilization, management, and employment of first responder resources but also greatly aided patient tracking and accelerated family assistance and victim accountability efforts.

**Recommendation: Fully adopt and implement WebEOC as SFO’s CMS tool, interconnect it with other regional agencies, and develop common practices for information sharing and resource management.**

When used to its full potential, a CMS can increase the overall situational awareness of incident command leadership and responding agencies, as well as support both unified multiagency command and the ability of response assets to collaborate laterally across the ICS structure. This allows agencies to respond more quickly to rapidly changing events and address any gaps in the response. While any CMS would enhance the operations of the SFO EOC, full participation in the regional implementation of WebEOC will significantly improve the Airport’s integration into the larger regional emergency management community, strengthen its management of similar airport related emergencies, and better connect it to a vital regional support network in the event of a major catastrophic event.

Implementation of WebEOC will also provide SFO with a much-needed utility for more effectively managing response and recovery resources should another Alert 3 or other large scale disaster occur. Of course, the implementation of any such system will demand the dedication of resources and staff time, as well as require the training of pre-identified EOC augmentation personnel from both the airport and partner agencies. SFO should engage the Bay Area WebEOC working group and seek assistance from partner agencies to ensure full integration into the regional network.

## Observation 8: Logistics and Resource Management

**Incident command is largely about matching resources to needs and getting the right assets and facilities, in the right place, at the right time, while not monopolizing capabilities needed elsewhere.**

Incident response and recovery activities require the acquisition and employment of a variety of resources to meet the evolving needs of the crisis. Basic resource management practices like sourcing, tracking, and staging ensure availability, timeliness, and accountability. As with incident command, resource management practices should be flexible, scalable, and adaptable to support any changes in conditions or operational requirements that may occur. In the early phases of a crisis incident, most of what is required may be available onsite or through local mutual aid agreements. As an incident grows in size and/or complexity, some resources may need to be obtained from outside agencies or purchased outright through agency procurement channels.

The resource management process can be broken down into two parts: resource management as an element of emergency preparedness and resource management during an incident. Preparedness activities are conducted on a continual basis to help ensure that resource needs are pre-identified and required assets are prepared to mobilize when called during an incident. State and municipal emergency management agencies often prepare pre-identified resource lists based on past experience and best practice. Resource management during an incident is a critical element of establishing and



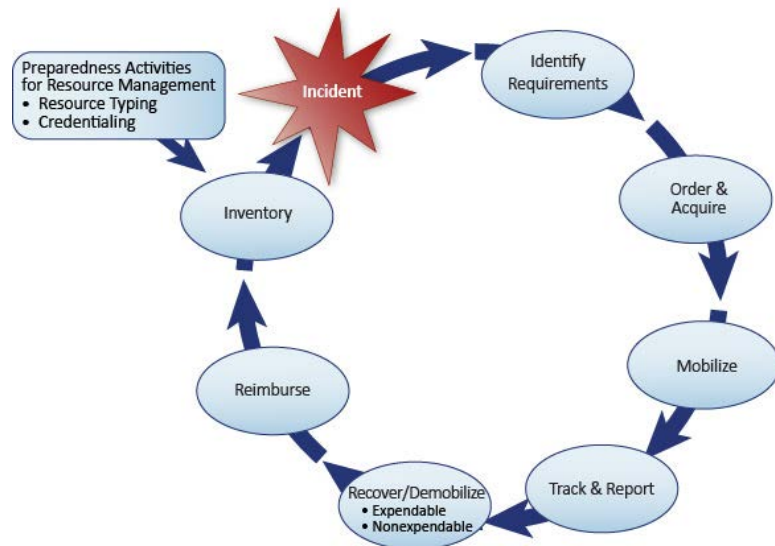
meeting incident objectives. Response agencies continually assess resource requirements based on an assessment of the situation and adjust the use of incident resources to meet identified needs.

Resource planning is a continuous process that runs from initial response all the way through to the end of recovery. When a resource need is identified, the request for that resource triggers a systematic process (shown in Figure 7)<sup>44</sup> where each asset is tracked from that initial request through demobilization using a structured and standardized approach. The ICP and/or EOC must be able to know, at a moment's notice, the status of all resources dedicated to the incident so it can identify any gaps in resources that must be addressed to achieve incident objectives and to ensure the safety of all deployed assets.

During Asiana 214, there was not an adequate system for logging and tracking resources needed for or used during the response. Basic resource management performed at the ICP largely centered on the variety of mobile public safety assets and other capabilities within the immediate vicinity of the crash scene. Neither the ICP nor the EOC had a total view of all of the resources either available, on

standby, or in staging. Although, given the modest scale of the event, this issue did not hamper response, it did complicate demobilization as more assets than were actually needed were mobilized and some assets on standby did not get the notice to stand down once the response was demobilized.

Without sufficient methods to account for the status of a resource requested, it is difficult to efficiently allocate and manage what are often limited and costly assets. Once acquired, resources need to be dispatched from their initial location to where they will be used or consumed. Accordingly, resource management and logistics also includes the establishment of staging areas, access routes, and the organization of escort and transportation assets. The ability to effectively manage on-scene response activities requires that the ICP know which resources are engaged in the response, which have been requested or are in transit, where additional resources are staged, and when assets are demobilized. Some Response Debrief participants expressed concern regarding the location of resource staging areas and access routes in support of incident response. With the chaotic nature of disasters and the potential for confusion, emergency management logistics will always be a challenge, but use of standardized and disciplined methods for resource management can minimize the potential for error and help to get the right assets and incident facilities in the right place, at the right time, and in a way that does not monopolize capabilities that may be needed elsewhere and can be demobilized and reassigned.



**Figure 7. Resource Management Process**



**Recommendation: Standardize practices for resource management and asset tracking and control, document new systems and procedures in the SFO EPM and EOC SOP, and train staff in the process and technology.**

General Omar Bradley, who led the largest contingent of U.S. land forces ever assembled during WWII, once said, "Amateurs study tactics; professionals study logistics." For the incident commander, this translates to the reality that no matter how good your people or tactics are, you have the potential to fail if you can't support them with what they need and employ them where they matter most. For this reason, logistics and resource management are the most essential functions conducted within an EOC, and special emphasis should be given to improving resource management functions between the EOC and the ICP outlined in the SFO EPM and EOC SOPs. In addition, SFO is encouraged to take maximum advantage of the resource management functionality embedded in WebEOC and ensure pre-designated EOC personnel are trained in both the process and technology.

Lastly, SFO should consider working with regional agencies to ensure that likely airport resource requirements are identified and factored into any preplanned resource lists prepared by San Francisco and San Mateo counties. This will be particularly important in joint planning for response and recovery from large-scale catastrophic incidents. The California SEMS includes a document – [SEMS Resource Ordering and Tracking: A Guide for State and Local Government](#)<sup>45</sup> – that provides context on how San Francisco and San Mateo county EOCs can support resource management for SFO emergencies.<sup>46</sup>

## Observation 9: Emergency Medical Services Integration

**Full integration of EMS into the incident command system structure is vital to effective end-to-end patient care and disaster victim tracking.**

Given the central role EMS plays in mass casualty events, incident management protocols call for the full integration of EMS resources as a distinct branch within the Operations Section of the ICS structure. Immediately after arriving on scene, the senior responding EMS leader reports to the IC and assumes the role of EMS Branch Director responsible for on-scene medical operations and the triage, treatment, and transportation of the injured. In San Mateo County, on-scene EMS operations for events similar to Asiana 214 are outlined in the County's Multi-Casualty Incident Response Plan.<sup>47</sup> As the ICS structure is established, and depending on the size and nature of the incident, other elements of the regional emergency medical system may need to be mobilized, to include EMS mutual-aid partners, medical evacuation (MEDEVAC) aircraft, and receiving hospitals.

In addition to the readiness of individual entities, joint plans, practices, and terminology are vital to ensure each can play its role in close coordination with the others. The California Public Health and Medical Emergency Operations Manual (CPHMEOM)<sup>48</sup> outlines the role of local public health and EMS agencies, to include coordination of pre-hospital and hospital medical care and family reunification. Patient tracking information must provide end-to-end visibility of the status and location of patients in each stage of the system. This end-to-end visibility is essential for purposes of patient accountability and family reunification and thus indicates the need for compatible and integrated systems.

As Asiana 214 did not have a full implementation of ICS, the EMS Branch within Operations was never established. The senior arriving EMS official attempted to engage the IC, but made the decision to organize medical assets independently because he felt the IC was overrun by other matters and there was no Operations Chief with delegated authority to organize an EMS Branch. In a larger and more complex incident, failure to fully establish ICS and integrate EMS within that structure could greatly compromise the range of activities related to patient care, handling, tracking, and accountability. Despite CPHMEOM guidance, it appears that the regional emergency medical system is somewhat fragmented by adherence to different local practices. This lack of standardization and integration could have adverse consequences for any future airport or other mass casualty crisis in the region.

**Recommendation: Encourage regional efforts to standardize and integrate practices across the emergency medical system and reinforce the full integration of EMS into the incident command structure.**

As previously discussed, additional ICS and crisis leadership training is recommended for those officials who will find themselves in command positions during a multiagency event. This includes EMS leaders and the broader emergency medical community. The integration and standardization of practices across the region – from the incident scene to receiving hospitals – would facilitate inter-jurisdictional mutual aid, ease hand-offs from one part of the system or jurisdiction to another, and ensure end-to-end visibility of patients under what can be chaotic circumstances. Asiana 214 provides a strong



example of the challenges presented by differing systems and protocols and the benefits to be achieved through standardization. SFO cannot solve these issues itself, but should voice its support for enhanced interoperability given its vested interest in improving coordination and response for on-scene incidents, particularly since nearly any incident with multiple casualties on airport property is likely to trigger a regional emergency medical response. SFO should also advocate for a common regional approach to patient tracking along with its airline and

American Red Cross partners. Improved patient tracking during medical operations, from the scene through to discharge from the hospital, will strengthen overall survivor accountability and family reunification after such events.

As one step toward EMS standardization since the Asiana 214 incident, the SFFD Airport Division and San Mateo County FD have coordinated through San Mateo County EMS to jointly utilize the EMT3

system (by Disaster Management Systems, Inc.) for patient tracking. The system is part of the San Mateo County Mass Casualty Incident (MCI) Plan and uses a multifunctional Triage Tag that is color-coded, numbered, and bar-coded. Triage and tracking are now consistent between the two agencies.

### Observation 10: Use of MEDEVAC Helicopters

**MEDEVAC helicopters and related ground support can provide rapid transportation of the critically injured when effectively integrated with the ICS structure.**

Well-equipped and trained helicopter crews and EMS practitioners can often get to an incident scene more quickly and transport patients faster to hospitals than land-mobile assets. In addition, they can provide critical care capabilities during patient transport that are comparable to or in some cases more advanced than their counterparts on the ground. Furthermore, they can augment vehicle-borne EMS units in mass casualty incidents when such resources are perhaps in short supply. Air ambulance resources can also be used to air-lift patients further distances, thus allowing ground units to transport patients to hospitals closer in. This helps to maximize use of all available resources.

Effective use of MEDEVAC helicopters depends on the ability of those on the ground to properly triage patients to determine which ones can benefit most from transport by air and to integrate those decisions with a robust patient transport plan. MEDEVAC helicopters also involve a higher level of risk, complicate ground operations at the incident site, require experienced aircraft handling personnel and use of incident command protocols for aviation support, and require the development and application of MEDEVAC plans and SOPs.

Just as with other response assets, employment of MEDEVAC helicopters can be scalable to the needs of the incident. Support can range from the simple use of one aircraft in a single sortie to multiple aircraft and flights in a more complex incident where a number of helispots and even a helibase are established for aircraft parking and servicing. As the incident and thus the number of aircraft grow, additional layers of aircraft control and support personnel may be required to ensure safe and effective MEDEVAC operations. For this reason, an Air Operations Branch is often established within the Operations Section of the ICS structure. If the incident is small, this function can be performed by the Medical Transportation Group Supervisor or the Operations Section Chief, assuming either has been designated; if not, aircraft coordination then falls to the IC.

Feedback during the debriefing indicated that MEDEVAC helicopter operations during the Asiana 214 response may not have been well-coordinated and aircraft may not have been communicated with, marshaled, or utilized effectively. MEDEVAC helicopters were not requested by the EMS Branch and instead self-dispatched to the airport to assist on their own. Unaware the MEDEVAC helicopters were coming, the incident commander did not establish specific landing sites (i.e., helispots) for aircraft operations. In addition, an Aviation Operations Branch and Branch Chief were not established within the ICS framework. In addition, there was no Operations Section Chief assigned who could have managed and synchronized this activity with the ground-based EMS operations underway.

Absence of preplanned ground handling personnel and refueling capability may have complicated helicopter operations and caused one or more loitering MEDEVAC aircraft to be returned to base

unused. According to airport staff, during the Asiana 214 response, none of these issues compromised the safe and rapid movement of the injured and only one actual MEDEVAC sortie was accomplished.

**Recommendation: Work with MEDEVAC service providers to assess their use at SFO and incorporate joint SOPs for associated air and ground support operations into SFO response plans.**

At SFO, joint SOPs for MEDEVAC helicopter operations must be developed in partnership with aircraft operators and partner public safety agencies. These SOPs should be reflected in both a revised EPM and in associated first responder job aids and checklists. The EPM should also address on-airport support for these aircraft, including air traffic control communications, plane marshals for ground handling, provisions for hot refueling, and guidelines for establishing helispots in relation to the emergency scene. These procedures should also include protocols for requesting air assets to avoid self-deployment. In addition to the SOPs and guidelines that may be in place among SFO's public safety partners, other references should be consulted for use in refining SFO plans for MEDEVAC helicopter employment, such as the FAA Advisory Circular AC 00-59 – Integrating Helicopter and Tiltrotor Assets into Disaster Relief Planning (November 1998),<sup>49</sup> the FAA Airspace Management Plan for Disasters (July 2012),<sup>50</sup> and the National Wildfire Coordinating Group's Interagency Helicopter Operations Guide (February 2013).<sup>51</sup>

### Observation 11: Planning Requirements and Emergency Procedures Manual

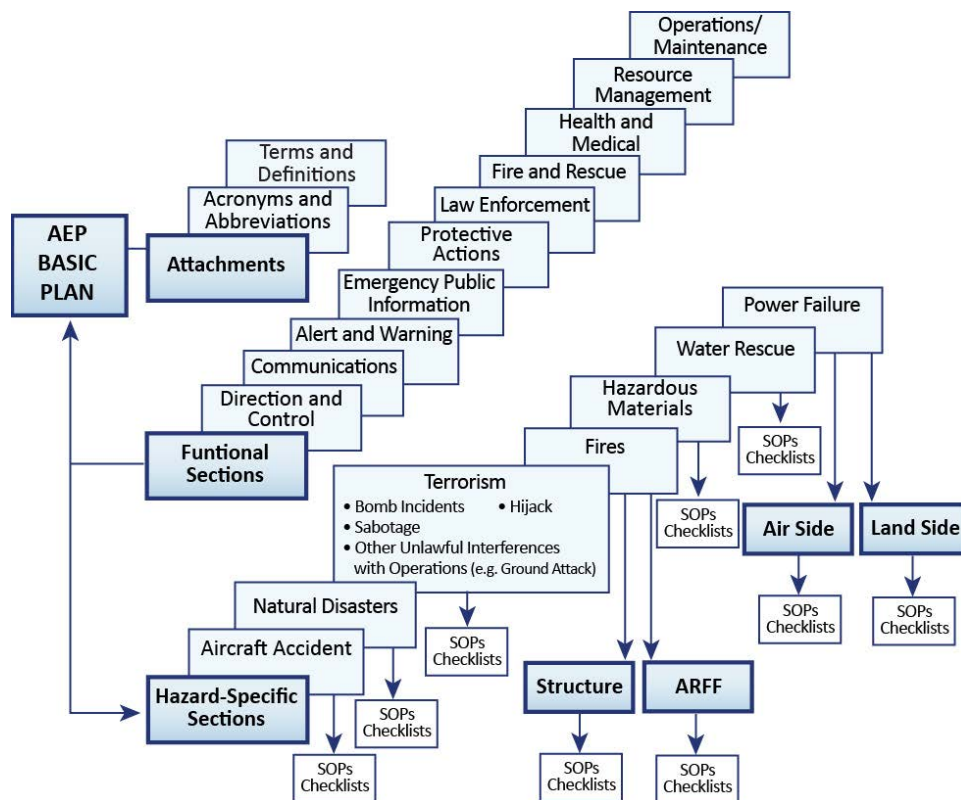
**Beyond basic FAA requirements, good Airport Emergency Plans must be functional, exemplify best practice, reflect broad stakeholder engagement, and be harmonized with other local and regional emergency response plans.**

Basic requirements and guidelines for the development, content, and format of Airport Emergency Plans (AEPs) are contained in 14 Code of Federal Regulations (CFR) 139.325 - Airport Emergency Plan<sup>52</sup> and FAA Advisory Circular (AC) 150/5200-31C.<sup>53</sup> In addition to providing a general outline of what a plan should contain, this Advisory Circular places considerable emphasis on the need for comprehensive, risk-based, all hazards planning; tailored application of the ICS; engagement of a broad community of airport stakeholders; and the importance of employing structured and collaborative approaches to both developing the plan and its constant socialization, testing, and refinement through a program of training, drills, and exercises.

The FAA's guidance on AEPs also stresses the importance of "functionality" in the plan's format and the ability of users to easily find what they need when they need it. To achieve this, the FAA further suggests a modular design and the use of a supporting family of SOPs and checklists. Emergency management community best practice includes adapting this information for in-field use in the form of role-specific job aids. The FAA's concept for modular design in development of AEPs is depicted in the family of plans and associated references shown in Figure 8.

At the core of the AEP is the application of the ICS. To underscore this point, the FAA presents various notional examples of ICS structure for an airport emergency, as well as the functional relationship between the ICP and the EOC. Site-specific and/or hazard-specific protocols for the use of ICS are typically ironed out in advance during collaborative joint planning and those agreements should be reflected in any AEP. Although AC 150/5200-31C uses FEMA's State and Local Guide (SLG) 101: Guide

for All-Hazard Emergency Operations Planning (September 1996)<sup>54</sup> as fundamental to AEP development, SLG 101 has since been replaced by FEMA with Comprehensive Preparedness Guide (CPG) 101: Developing and Maintaining Emergency Operations Plans (Version 2, November 2010).<sup>55</sup> Nonetheless, like SLG 101, CPG 101 also describes the importance of taking an all-inclusive “whole community” approach and further emphasizes the need for harmonization and integration of response planning efforts across agencies, jurisdictions, and levels of government.



**Figure 8. 14 CFR 139.325 - Airport Emergency Plan and FAA Advisory Circular AC 150/5200-31C**

Although the organization and format of the SFO EPM may meet FAA criteria, those criteria should be viewed as minimum requirements. As such, they do not accurately reflect the full nature of the functional, comprehensive, and well-developed emergency response plan SFO may require. Review of the SFO EPM and subsequent discussions among Response Debrief participants indicated that not all key personnel and agencies were as familiar with its contents as they needed to be. In addition, it appeared that major assumptions about response strategies and the use of essential resources and facilities may not have been adequately identified, tested, and validated. Examples of the latter include the possible overtasking of operations personnel in the EPM, untested plans for passenger and family assistance locations, and the apparent lack of advance planning with the ARC, whose representative expressed concerns about the perceived need for improved operational coordination with the airport. In addition, simple references to ICS throughout the EPM are not sufficient to ensure its effective employment. The inclusions of a notional ICS organization chart, plus clear and concise

definitions of roles and responsibilities of critical ICS positions, both on scene and within the EOC, are necessary to simplify and speed the organization and management of essential response activities and assets. ICS was not fully implemented in response to the Asiana 214 crash, and the absence of more robust description of its use in the EPM is cause for concern. Moreover, elements of the plan have not been translated into job aids and checklists for ease of reference by responders in the field.

These concerns about the EPM would seem to call into question whether there was whole community collaboration and commitment to the plan's development, which is essential to its successful implementation in a crisis. Moreover, discussions during the Response Debrief made it clear that SFO was not well integrated into the regional network of emergency management, given the lack of connectivity and operational integration with EOCs and emergency management agencies in both San Francisco and San Mateo counties during Asiana 214. This lack of operational integration would seem to support the need for stronger interagency participation in any update of the SFO EPM, as well as the need for SFO to be better connected with the ongoing planning efforts of surrounding agencies. This should not only add value to the SFO EPM, but also help ensure airport concerns are reflected in the local and regional plans of others, especially those concerning a regional catastrophic event.

**Recommendation: Conduct a thorough critique of the SFO EPM, organize a joint agency planning effort to revise its contents in line with FAA and FEMA guidance, and integrate it with other local and regional plans.**

The Supreme Allied Commander during World War II, General Dwight D. Eisenhower, is quoted as saying, *"Plans are nothing; planning is everything."* By working together and managing the diversity of opinions, conflicting requirements, and the dynamic tension that comes from any shared planning process, those who have to execute a plan will better understand it: its context, its exigencies, and even the other agencies involved, to include their respective needs, capabilities, and tactics. Through that planning process, they will also have built relationships and achieved a higher level of mutual respect, sense of shared purpose, and commitment.

The goal of the planning process then is not simply the plan itself but the effective execution of disaster response operations guided by that well-developed plan. The planning process must provide a basis for advance collaboration and be aggressively tested in training and exercises that will deliberately identify any gaps and serve to strengthen the ability of responders to work together and adapt to any possible changes in conditions.

As SFO revises its EPM, it is suggested that all major stakeholders be engaged, the process be fully collaborative, and that a senior official from each major participating agency sign off on its contents. It is further suggested that SFO engage local emergency management agencies more directly for EPM planning support and determine how best to integrate SFO into broader local and regional disaster response planning efforts. Local emergency operations plans should reflect the expected roles and responsibilities of key personnel and assets along with incident specific response protocols for SFO related incidents in their plan annexes, checklists, and job aids to ensure the fullest possible integration and coordination among regional emergency response partners and the airport.



## Observation 12: Public Information

**Timely, accurate, and well-crafted public information can greatly enable the effective management of an incident and will address both airport-specific ramifications and larger regional and political considerations.**

In an emergency, clear, accurate, and timely information about the nature of the circumstances, actions being taken in response, and what people can do themselves can help save lives, lessen anxiety, and change circumstances by informing and influencing attitudes and behavior. An organization's ability to provide sound and actionable information is an art form that requires careful planning, the use of a range of available media, and the cooperation of those directly involved in managing the crisis, along with others at the periphery who can provide insight and perspective. Accordingly, the ICS includes a Public Information Officer (PIO) position to manage this activity. That position may exist at the ICP or at the EOC but wherever it is, it must be embedded in and be an integral part of the incident command framework. It must also work in close conjunction with the PIOs of other organizations and agencies involved in the incident to ensure effective and consistent messaging. Failure to do so could intensify and prolong the extent of the incident and/or have negative image or political ramifications.

Because PIOs are responsible for developing and releasing information about an incident to the news media, to incident personnel, and to other appropriate agencies and organizations, only one senior PIO is normally appointed for each incident, including multi-agency responses under Unified Command. Within ICS, a Joint Information Center (JIC) is an activity where members of the various organizations and agencies involved pool their resources and work collaboratively to perform coordinated crisis communications and public affairs functions. They typically do this using a Joint Information System (JIS) that helps organize, integrate, and coordinate information to ensure consistent messaging across disciplines, jurisdictions, and the private sector. The SFO EPM, the San Mateo County Operational Area Emergency Operations Plan,<sup>56</sup> and the City and County of San Francisco Emergency Response Plan each call for the establishment of a JIC in multiagency incidents. The latter incorporates an Emergency Support Function (ESF) #15: JIS Annex,<sup>57</sup> which outlines primary relationships, processes, and information flows to be used in the establishment of a multi-agency JIC.

Each disaster has its own complex network of both formal and informal information exchange. In addition to very short news media cycle times associated with on-the-ground live reporting, the escalating use of social media and the growing proliferation of smart phone and computer tablet technology make it especially challenging for PIOs to stay ahead of the wave in a public information campaign. While there is potential for misleading information or conclusions emerging from nonofficial sources, it is also possible that the information from these sources can be more accurate and timely than what PIOs can provide. It is therefore vital that PIOs have firsthand knowledge of unfolding events and are appropriately positioned in the ICS structure to not only verify reports received from both official and unofficial sources, but also to coordinate that information with partner organizations and agencies to ensure the broadest possible dissemination of the best and most accurate information at the time. In addition, PIOs and their emergency response leadership need to plan for and embrace social media technology as a part of pre-incident planning and ensure that their

systems and staffing are sufficiently robust to manage the deluge of both traditional media and social networking internet activity that emergency incidents will likely attract.



During the Response Debrief, participants generally considered the SFO public information campaign to be very effective. Its quick reaction and proactive use of social media was a distinct advantage in providing timely public information. However, it was indicated that the computer server that supports its website access was overwhelmed and went down for a time. Some of the information provided by SFO through those channels may also have been inaccurate and/or not updated with newer input as it became available, at least not in a timely way. With the absence of full implementation of ICS at the ICP and the SFO EOC, it seems that the SFO PIO function was not firmly embedded within the incident management framework of the Asiana 214 crash response, and the inherent value of that relationship may not have been fully realized.

Related to incident command, it appears that no JIC was established, nor was a JIS implemented to provide virtual coordination of the public information campaign across regional EOCs or among SFO's airport partners, to include United and Asiana Airlines and the Red Cross. Lastly, some participants felt that while the external information campaign was effective, the same may not have been true for operational and public information provided to the airlines, passengers, tenants, contractors, and concessionaires transiting through or resident at SFO.

**Recommendation: Capitalize on the success of the SFO public information effort by incorporating lessons learned into the EPM and better integrate the PIO as part of incident command through the use of JIC and JIS concepts.**

The nature of an emergency, the magnitude of public and media attention, and the speed of information flow all conspire to challenge a PIO function that is not sufficiently staffed and equipped to manage the deluge, no matter how competent it may be in crafting public messages. It is an issue

of scale. Moreover, the incident, and thus the PIO function, is a part of a larger web of relationships. Some of these relationships exist around the incident response and the people directly impacted, while others stem from the private sector, political sphere, and the general public. All of these audiences have unique needs and may be impacted in one way or another by the handling of public information. It is suggested that SFO fully embed the PIO within the ICS structure of the EOC and that a new EOC SOP clearly outline that role in relationship to the IC and supporting agencies and organizations. It is further suggested that SFO employ both a JIC organization and a JIS to better manage information flow and messaging. This may on occasion require the deployment of PIOs from other agencies and organizations to augment and support the SFO PIO as a part of an integrated JIC team. Establishing such a JIC will have the dual benefit of scaling up the PIO function to meet the demand for information and better anticipating stakeholder needs and coordinating messaging across those agencies and organizations.

As SFO considers the role of its PIO in emergencies, it is suggested that the airport engage the San Francisco and San Mateo county emergency management agency PIOs to do advance coordination on public information planning and to connect SFO into the larger network of PIO resources and activities available to it in the region. This includes the ongoing implementation of the Bay Area Emergency Public Information and Warning Strategic Plan,<sup>58</sup> which is intended to integrate, sustain, and enhance the collective public information and warning capabilities of agencies across the region.

**Note:** It must be recognized that even before the debriefing sessions were complete and during the course of the writing and review of this report, SFO management, in partnership with its public safety and airport partners, has already taken proactive steps to plan for and where possible initiate improvements in preparedness, response, and recovery capabilities in line with the observations and recommendations contained herein. Those efforts will accelerate with the development and implementation of a comprehensive lessons learned improvement plan.

## Recovery Debrief Summary

On August 8, 2013, a debrief focused on recovery was conducted to further develop a chronology of events, capture lessons learned and promote best practices, address gaps in capabilities and identify recommendations for refinement of SFO and agency plans, and overall build an stronger emergency response team. The ambitious efforts of airport personnel, federal partners, and contractors exceeded expectations by repairing and reopening the runway within 6 days of the incident and well ahead of original schedule. The airport proved to be resilient in its efforts to maintain continuity of operations, but there is still room for improvement such as the development of a SFO Business Continuity Plan, the need for better operational coordination during the hours prior to reopening the runway, and better handling of the transition from response to recovery and the hand-off in incident command leadership.

The Preparedness Cycle is applicable to all missions areas identified within the NPG, including recovery.



To ensure the fullest possible capture of best practices and lessons learned, SFO leadership focused the Recovery Debrief on the period identified as +12 hours (midnight on July 7, 2013) until the reopening of the runway (5:05 PM on July 12, 2013). Using the same format as the response debrief, a set of recovery specific core capabilities were selected to target discussion topics throughout the Recovery Debrief and provide a framework for SFO planning for corrective action and continuous improvement. A thorough analysis of notes captured revealed many themes addressing operational coordination, the

importance of health and social services for survivors, and expediting economic recovery. These core capabilities are complex and require a comprehensive and coordinated improvement effort that is multidisciplinary and cross-jurisdictional in nature. The following observations drawn from the facilitated debrief amplify participant input and provide specific recommendations for consideration.

## Participating Organizations

- Airfield Operations
- Airport Communications
- Airport Landside Operations
- Asiana Airlines
- CAL-OES
- FAA
- FBI
- San Francisco County EMS/DEM
- San Mateo County EMS
- San Mateo County OES
- SFFD
- SFO Airport Duty Managers
- SFO Facilities
- SFPD
- TSA
- United Airlines

## Best Practices and Lessons Learned

### Observation 13: Business Continuity Programs

**Successful business continuity programs are based on in-depth understanding of mission essential business processes and anticipation of early recovery decisions facing organizational leadership.**

Nowhere is the importance of a comprehensive business continuity program more evident than the response to a no-notice incident. Information is scarce and critical decisions made in the earliest stages of the response will set the tone and course for everything that follows; delays are costly and mistakes difficult to overcome. While the types of incident scenarios and underlying assumptions that trigger emergency response activities are not always the same as those that trigger a business continuity response, a strong business continuity program will acknowledge that the potential exists and ensure that planning assumptions consider the implications of simultaneous emergency and continuity responses on the organization's priorities and the availability of key personnel and resources. Having this depth of knowledge allows an organization's leadership to make informed decisions, even in the earliest stages of a response, and have the confidence that individual decisions support the entirety of the complex and interdependent systems necessary to conduct essential functions. Furthermore, having a documented system and clear recovery priorities for SFO will improve the ability of each associated organization within the airport community to develop its own plans. These plans support overall SFO continuity efforts and ensure that trained staff can be placed into action without unnecessary delay.

The foundation of an effective business continuity program is the planning process itself. The Business Continuity Plan (BCP) identifies key players – those with the authority, knowledge, and resources necessary to chart a course of action – and builds a time phased approach to an effective and prioritized return to normal operations. This time phased approach is built upon an analysis of how the organization conducts its business, where critical interdependencies exist across activities and services, the likely resources required and available to support response and recovery efforts, and, most importantly, restoration priorities and objectives that consider the costs or consequences associated with failure to perform the activities or services. No organization can completely avoid disruptions, so the ultimate goal is to build a resilient organization that can effectively mitigate them and return to “business as usual” as quickly as possible and at lowest cost to the organization.

The challenges presented by Asiana 214 as a unique no-notice event resulted in early resource decisions that were difficult to undo and caused ripple effects to interdependent functions throughout the airport community. Although SFO's operational leadership is highly experienced and knowledgeable about the breadth of the enterprise, they were unable to fully anticipate the consequences of all response decisions across the entirety of SFO's operations. For example, the decision to hold passengers in CBP's secure space within the International Terminal may have initially seemed appropriate during the initial response; however, it later caused disruptions in passenger handling operations when airlines were unable to deplane passengers arriving on international flights or process those awaiting flights now cancelled.



**Recommendation: Establish a comprehensive business continuity program based on risk and business process analyses, coordinated plans and procedures, anticipated resource requirements, and organizational systems for implementation and management.**

The strength of SFO's business continuity program relies on having an effective business continuity team that constantly seeks to improve the airport's resilience to disruption. The team should revisit airport hazard and risk assessments prior to conducting a thorough business impact analysis (BIA) that outlines SFO priorities and recovery timeline objectives for all mission essential functions and services. The BIA will support the identification of key personnel, resources, vital records, and other requirements associated with maintaining those mission essential functions.

As a part of this review, it should also be recognized that the allocation of terminal resources for emergency response purposes could in itself cause business disruption impacts. There may also be conflicts between emergency response and business continuity strategies and priorities that need to be anticipated and addressed. If the BIA identifies gaps in preparedness or available resources, staff should document strategies for obtaining the needed resources and factor those needs into the airport's recovery timeline objectives.

Once the analyses described above are complete, the team can develop the BCP in coordination with the EPM. Airport Cooperative Research Program (ACRP) Project 3-18: Operational and Business Continuity Planning for Prolonged Airport Disruptions<sup>59</sup> provides airports with a guide to developing a BCP in coordination with existing emergency response plans. As risks are always changing, business continuity planning is a cyclical process following the preparedness cycle. It is therefore important for the team to continuously seek opportunities to enhance SFO's business continuity strategies in response to those changing risks. Those strategies must be implemented, evaluated, and improved through ongoing training and exercises for those personnel who will likely to execute the plan.

When either the BCP or EPM are developed or regularly updated, it is essential that assumptions contained in the BCP be reconciled with the EPM to avoid or resolve any conflicts. Particular attention should be given to the use of airport facilities and resources, and especially the expectations around the personnel needed to implement both plans. FEMA's PS Prep Program<sup>60</sup> offers guidance and resources for private industry BCP implementation and organizational resilience in accordance with three business continuity standards, as well as optional third party accreditation of an organization's preparedness.

In January 2013, SFO management commissioned an internal committee to facilitate development of policies and procedures to ensure that airport is returned to normal as soon as possible following a significant disruptive event. The committee meets monthly and its work focuses on three specific areas: 1) caring for the airport community; 2) business resumption; and 3) emergency communications. This committee provides a ready platform on which to launch a more structured business continuity planning effort.



## Observation 14: The Role of the EOC in Recovery Management

**Emergency management spans a continuum from response through recovery and, although the players change, the EOC provides a valuable focal point for coordinating every phase of that continuum.**

After initial response activities have concluded, the EOC remains a critical hub for supporting recovery activities by establishing priorities and managing the availability, application, and monitoring of resources. As previously described in the discussion of the EOC's role in response, the EOC provides an ideal venue for multi-agency collaboration and planning. This is also true for addressing complex business resumption and recovery efforts, as it is a singular entity that can effectively facilitate communications and information exchange with all relevant parties. This includes those involved in large-scale recovery efforts described in the National Disaster Recovery Framework, which outlines the nation's system for coordinating recovery efforts across various levels of government and the private sector.<sup>61</sup>

The EOC provides a mechanism to address "policy decisions beyond [the] authority and scope"<sup>62</sup> of any one incident and foster unity of command and unity of effort across the organization. By relying upon pre-established roles, responsibilities, systems, and procedures, the SFO EOC can ensure that each issue is thoroughly analyzed and that the needs of all relevant parties have been considered and incorporated into recovery planning and operations. When staffed by people with the authority to speak on behalf of their organizations and make binding decisions, the EOC facilitates the quick and thorough resolution of issues that may otherwise impede the progress of recovery. Stand-up of an EOC in the early stages of response and continuing on through short-term recovery can help to ensure continuity and consistency of information sharing and resource management.

Many of the decisions faced during business resumption and recovery are related to resources: identifying what resources are needed, where they can be obtained, how they will be used. It is imperative that these decisions be considered in light of SFO's overall priorities and timelines. If resources are committed in ways that contradict priorities, or if resources are not made available in a timely fashion, the schedule of business resumption and recovery is placed at risk. For example, knowing that the removal of the aircraft from the crash site could have been discussed and negotiated sooner in the process could have prevented any delay in obtaining the necessary resources.

SFO was fortunately able to rely upon long-standing relationships with specialty contractors and emergency contracting provisions to support repairs to runway 28L. Although the Airport was lucky to have these relationships for Asiana 214, future incidents may require addressing more unusual or non-traditional problems demanding creative solutions and the pursuit of resources from outside the airport community. Properly organized, the EOC can play a major role as problem-solver and broker by not only crafting a timely solution but also ensuring that the needed technical or material resources are acquired and put to their best and most appropriate use, resolving any conflicts along the way. In the case of Asiana 214, one such challenge was the limited availability of foreign language translators which, if the EOC took a whole community approach<sup>63</sup>, may have been available through the CBP unit at SFO or from among the airport's custodial staff.

**Recommendation: Ensure that EOC plans clearly outline roles, responsibilities, and procedures for organizing and monitoring recovery activities, and how to implement resource management processes.**

Using the lessons learned from this incident, SFO should identify processes for transitioning from response to recovery, as well as the major steps in the recovery process, and develop the plans, procedures, and checklists needed to guide future efforts. Effective recovery management will require departments and agencies to provide staff members fully authorized to take necessary actions on behalf of their organizations. These individuals should not only be trained on SFO EOC-specific policies and procedures, but also participate in training and exercise activities conducted by San Mateo and San Francisco counties to better understand the processes for requesting and receiving outside support for executing recovery tasks essential to returning airport operations back to normal. In addition, the resource management recommendations discussed and identified in Observation 8 can be applied to recovery asset management as well as response.

### Observation 15: Project Management Practices for Recovery

**Implementing best practices of project management, to include within the Planning Section of the EOC, can facilitate leader decision-making and ensure faster and more efficient recovery efforts.**

Within the collaborative and whole community structure provided by the EOC, major issues and activities will still need to be professionally planned and managed. In his book, *Disaster Recovery Project Management: Bringing Order from Chaos*,<sup>64</sup> Randy Rapp addresses the managerial skills necessary to manage a complex recovery effort and discusses the challenges of selecting, employing, managing, and monitoring contractors associated with such efforts. Compared to typical construction efforts, recovery from incidents is associated with a different set of conditions and variables such as dramatically shorter timeframes for project planning and pressure to adopt aggressive schedules to rapidly execute complex tasks.<sup>65</sup> SFO's significant role in the Bay Area's response to and recovery from large-scale incidents further highlights the critical importance of restoring essential services as quickly and efficiently as possible. The ability of airports to facilitate the transport of passengers and cargo is closely tied to both emergency response and long-term economic recovery.<sup>66</sup>

Strong SFO leadership and a professional project management approach were very instrumental in successfully accomplishing the highly complex and interdependent tasks of aircraft hull removal and restoration of various airport systems damaged during the Asiana crash. A project manager with considerable experience in driving infrastructure improvement and repair projects was assigned to plan and direct the recovery effort. His structured approach to the problem and his skillful use of specialty contract support and airport maintenance staff helped speed the process of recovery and the earlier than anticipated return of the airport to full operation.

Although there were no open contracts at the time of the incident, the airport has long-standing relationships with some specialty contractors who reached out quickly to offer their assistance to the repair and recovery effort. The Director and legal staff worked with the City to access short-term emergency contracting capabilities and obtain the necessary support for the repair effort. Once these contracts were established, the project manager coordinated with all relevant parties and maintained

a single integrated project schedule and Gantt chart that aligned repair activities with required approvals and clearances; these tools were constantly updated as the situation evolved. The project manager also maintained accurate records of the time and monies expended on all repair efforts.

During the recovery process, responsibility for removal of the aircraft wreckage and addressing chain of custody issues required extensive coordination among airport staff, police, contractors, the airlines, FAA, and the NTSB. As a function of efficiencies gained through sound planning and project management, the release time for re-opening runway 28L was accelerated multiple times. As this occurred, it was necessary to re-coordinate the various procedures and clearances needed. By having a sound and integrated plan, and by maintaining tight control, the project manager was able to ensure that all parties involved were kept informed about the changes so adjustments in their work could be made and unity of effort and an essential spirit of collaboration among all the parties maintained.

**Recommendation: Create a systematic project management approach for future EOC-coordinated recovery efforts based on the strong leadership and the professional project management practices employed during this incident.**

A systematic approach is based on procedures, documentation, and templates that can be used by future project managers to effectively guide similar or more complex recovery efforts through the EOC. While best practices were clearly identified from this incident, the Project Management Institute's post disaster rebuild methodology (PDRM)<sup>67</sup> may better illustrate some of the assumptions and requirements associated with larger-scale recovery efforts, particularly those impacting the greater Bay Area community. As previously discussed in this report, WebEOC is a tool used in the Bay Area and may be helpful in the management of recovery projects.

The ACRP Project 4-12: Integrating Web-Based Emergency Management Collaboration Tools into Airport Operations<sup>68</sup> was recently released and may be a useful guide for how collaboration tools can be implemented in support of recovery project management and organizing key incident information. Regardless of the system selected, the EOC must have a robust and well-documented incident management system and associated procedures for information sharing to ensure that all relevant parties have access to appropriate information for planning and decision-making. Once documentation and systems have been identified and developed, SFO must pre-select staff to serve in these project management roles and provide them with the project management, incident management, and/or other related training and education required.

### Observation 16: Operational Coordination with Investigative Agencies

**Full coordination with and among the NTSB, FBI, and any other investigatory agencies is necessary to successfully implement recovery plans and reestablish airport operations as quickly as possible.**

The NTSB is responsible for investigating civil aviation incidents, while the FBI maintains jurisdiction for investigating incidents caused by criminal acts. Both agencies have broad responsibilities and authorities for carrying out investigative activities and, as such, will play a large role in setting the overall course and schedule for recovery following an aviation incident. SFO must understand and anticipate these activities, such as evidence collection and witness interviews, if it is to efficiently

schedule and dovetail different streams of work as appropriate. This will allow SFO to make the best use of all available windows of opportunity in the competing work schedules of its partners to the recovery effort.

Early and ongoing engagement and coordination with the NTSB and FBI can help to better synchronize seemingly independent processes into a single integrated set of milestones and schedules. Such an integrated plan allows all parties involved to have the shared situational awareness needed to de-conflict operations and thus better achieve their individual agency goals. The NTSB investigator-in-charge (IIC), “Go Team” of NTSB investigators, and the FBI Special Agent in Charge (SAC) may have the ability to adjust investigation schedules to accommodate critical activities necessary to achieve the airport’s recovery timelines. To that end, SFO must be able to clearly state from the outset all major decisions, milestones, requirements, and activities associated with recovery plans to create a shared understanding of the path forward. The need for engagement and coordination with the NTSB and FBI extend beyond the creation of timelines, as there are also critical resource, safety, information, and transfer of responsibility discussions that must occur at various points during the recovery phase.



In this incident, the FBI initially declined requests to reopen unaffected runways because the NTSB had not arrived on scene and the scale and scope of the investigation had not been determined. However, SFO leadership met with the FBI SAC and explained how SFO’s closure was disrupting other airports and carriers across the country. After reviewing the needs of the investigation and the importance of restoring SFO’s operations, the SAC coordinated with the NTSB to approve the request and reopen unaffected runways within 4 hours of the crash. In another example, some of the NTSB’s resource requests were pre-identified and arranged prior to arrival, such as buses and support staffing needs, while others were not adequately communicated in advance, such as the need for office space and

infrastructure support (e.g., internet) for 100 people. Once the investigation was underway, NTSB staff was not always clear on whom to ask for various elements of information they needed, resulting in duplicative requests and attempts to fulfill them. SFO was fortunately able to reconcile these demands and facilitate the NTSB's requests without delaying the investigation, but these unplanned demands temporarily diverted staff attention and resources away from other important recovery priorities.



In future incidents, SFO can play a major role in facilitating open dialogue and creating shared understanding, which will open unique windows of opportunity to coordinate recovery activities alongside the investigation. For example, SFO learned from this incident that certain NTSB on scene activities were suspended for the conduct of off-site meetings and briefings and in the evenings due to lack of daylight. In a future incident, this knowledge could enable SFO to coordinate with the NTSB to better use all available

opportunities to accelerate recovery. In another example, damage assessments and repair planning could be scheduled after hours while NTSB on-scene activities are suspended, rather than trying to intermittently squeeze them into small gaps in the on-site investigation schedule. The following topics or issues were identified as areas where SFO leadership engagement with NTSB and FBI leadership was essential to the success of both investigative and recovery efforts for Asiana 214, thus presenting opportunities for pre-planning and earlier coordination in a future incident:

- Securing access to witnesses, subject matter experts, and critical incident information
- Establishing safety plans and processes for the investigation and recovery phase in recognition of the potential hazards presented by the site itself and number of different agencies present
- Establishing a secure perimeter and providing site access/escorts to investigative agencies
- Defining the scope and scale of the crash site to allow the reopening of unaffected runways
- Coordinating activities and schedules to allow access to the investigation site for the conduct of damage assessments and planning repair efforts
- Determining the disposition of debris, planning for the release of the wreckage and runway, and assisting with the storage of evidence

**Recommendation: Establish mechanisms for coordination and dedicate appropriate personnel and resources to support investigative agencies to facilitate a faster and more efficient recovery.**

Staff can develop more effective business continuity and recovery plans by coordinating with the NTSB and FBI to better understand and document their expectations, roles, responsibilities, and planning assumptions. As was discussed, the NTSB was the first agency involved in the response and recovery



effort that did not have pre-existing relationships with SFO and its response partners. Using Asiana 214 as an opportunity to expand that relationship before a future incident will create a recovery effort that is more effectively coordinated with the NTSB and its investigation process.

Planning efforts must also address the NTSB system by which certain organizations and individuals can be asked to join as a party to an active investigation.<sup>69</sup> The Statement of Party Representatives to NTSB Form<sup>70</sup> outlines the NTSB's expectations of party representatives, but key staff and partners should fully understand associated legal and practical considerations, including workload and available resources, prior to accepting or declining an invitation. Whether SFO accepts party designation or not, creating specific liaison positions to support the needs of an NTSB investigation may improve coordination in a future incident. Individuals slated for this role should be fully conversant in SFO's business continuity and recovery plans as well as attend the NTSB's Accident Investigation Orientation for Aviation Professionals<sup>71</sup> or similar courses to be fully trained on the NTSB investigation process.

### **Observation 17: Customer Service During Recovery**

**Quality customer service is a determining factor in an airport's public image and competitive position and therefore must remain a high priority throughout both response and recovery operations.**

It is natural and appropriate to focus the airport's considerable resources on the survivors of any incident where injuries or fatalities are sustained as well as efforts to return airfield operations back to normal as quickly as possible. At the same time, however, it is important to remember the cascading effects of such an event on the larger community of travelers, visitors, contractors, and vendors/concessionaires who may also be impacted or at least inconvenienced.

The resulting disruptions caused by the cancellation or delay of subsequent flights may significantly inconvenience other passengers and create stressful situations for employees, particularly when it is impossible to provide accurate timelines for restoration of normal service. The effects of the incident may be felt by the airport community for hours, if not days, and tensions will grow as patience and understanding wane. Coordinating solutions to these disruptions involves a complex web of various airports,

carriers, and regulatory agencies at SFO, across the country, and even internationally. Although SFO is not responsible for the majority of the decisions or actions necessary to resolve these disruptions, it is the SFO community that is interacting with these affected passengers face-to-face.





Some travelers may need assistance with translation and language services to simply understand what has happened, while others need guidance on how to navigate an extended delay in an unfamiliar place. For those individuals simply inconvenienced by the incident, a small gesture of goodwill from SFO could leave a lasting impression, like a temporary suspension of parking fees on the day of the incident. Air carriers bear primary responsibility for the needs of their passengers, but these extra efforts are a recognition that continuing to focus on customer satisfaction by going above and beyond basic requirements will make a positive impact on the SFO community's image, if not its bottom line.

Aside from the inconveniences of the ground stop and disrupted travel, the proximity of Asiana 214 to the terminal and runways resulted in numerous witnesses to the event, both staff and visitors. Passengers remained on aircraft stopped mid-taxi on the tarmac, which provided a direct view of the survivors escaping the crashed plane and emergency response activities. Passengers arriving on incoming aircraft after long overseas trips were unable to disembark, as response activities occupied critical gates and customs spaces, and were kept on their planes for extended periods. These visitors and passengers are not identified as victims of the incident, and their situation cannot be compared to those survivors from the crashed plane, but they were significantly impacted and may have benefitted from additional support and attention from their respective airlines and SFO.

During the debrief, SFO staff described the situations cited above and recognized that their focus on the emergency response to the crash may have delayed their recognition of emerging customer service issues with passengers stranded on aircraft and in the terminals. Within the EOC, staff began to appreciate the ripple effect of the incident on passengers and visitors throughout the airport, but was uncertain about who had responsibility for identifying and meeting customer service needs. In one instance, CBP was requested to provide a briefing to a flight that had been diverted from another airport and was sitting on the tarmac. CBP officers were able to board the flight and provide an update on the situation to the crew and passengers, but this was not standard practice or identified as a CBP responsibility in any plans.

**Recommendation: Develop strategies to incorporate customer service priorities into response and recovery planning and processes, to include an emphasis on public engagement and communication.**

Response and recovery plans must clearly outline customer service as priority to be considered throughout the lifecycle of an incident. This will help to ensure that customer needs are factored in as a part of incident management decision-making and given appropriate emphasis. In reviewing and updating SFO response plans, staff should consistently seek to consider the impacts and consequences of critical decisions from a customer service perspective, "how will this decision impact our various customers and stakeholders, what needs or requirements will this create, and how can we minimize or mitigate those impacts that cannot be avoided?"

As incident response and recovery will quickly deplete Airport Commission personnel resources, SFO should have strategies in place for harnessing the full capability of the airport community to meeting customer and stakeholder needs following an incident. Special emphasis should be placed on targeted engagement through established airport councils or working groups along with regular and reliable public communications. This is vital to ensure that not only are travelers and airport visitors able to

make informed decisions, but also those airlines, contractors, and concessionaires on whom the public depends are better able to support the recovery or at least help avoid the further disruption.

The Transportation Research Board's [ACRP Project 04-13: Integrating Community Emergency Response Teams \(CERT\)](#)<sup>72</sup> at Airports will provide guidance on how established CERT programs can be integrated to support airport response and recovery efforts.<sup>73</sup> SFO may even want to consider establishing its own CERT or comparable team within the airport, comprising staff without other emergency response and recovery duties, to focus on visitor and customer service issues. These individuals can be trained to provide basic support and outreach and be ambassadors on behalf of SFO, as well as be a reliable conduit for consistent messaging and public information. Finally, although those directly involved in the incident received first priority, disaster behavioral health or psychological first aid resources for witnesses and other passengers were made available through the American Red Cross and greater San Francisco and San Mateo communities.

SFO leadership should continue to work with their community partners to determine how it can best facilitate customer access to these resources in a future incident. The Substance Abuse and Mental Health Services Administration (SAMSHA) offers a "Psychological First Aid" program<sup>74</sup> with resources designed for those organizations providing early assistance to affected individuals and families, which may be beneficial to institute at SFO. Disaster behavioral health considerations should be included in any revisions of the SFO EPM and the airport's business continuity planning work now underway.

### Observation 18: Setting Priorities for Health and Safety in Recovery

**Comprehensive health and safety programs identify and address the unique hazards present during recovery operations and facilitate the employment of strategies to mitigate the risks identified.**

The investigation and recovery from a plane crash on the airfield presents a wide range of significant hazards that must be identified, planned for, and carefully monitored at all times. In addition to the routine hazards faced by airport personnel, there are additional hazards created by exposure to the wreckage and associated debris, the number and type of additional personnel requiring access to the airfield, and the potential risks associated with making repairs to equipment and infrastructure while the airport is still operating. In addition to physical and operational hazards, a traumatic incident can trigger fatigue, stress, and emotional impacts in responding personnel. This fatigue and stress can itself lead to a lack of awareness of one's surroundings, or poor judgment in critical situations, which can result in dangerous conditions.

ICS protocol provides for the identification of a Safety Officer who is responsible for ensuring the safety of all personnel at the incident scene. However, the need for incident safety oversight continues even after the demobilization of response personnel and command structures, particularly as the airport's focus shifts to hazards associated with the recovery effort. There were several possible hazards resulting from Asiana 214 that were not immediately identified or mitigated, including electrical power issues, hazardous materials, and accountability of personnel on the airfield during the investigation and subsequent recovery period. These risks were identified after the fact, and numerous personnel were conducting recovery activities with no awareness that they were being

exposed to these potential hazards. Fortunately, none of these hazards resulted in personnel injuries during this incident, but when the potential for serious injury is present it should be remedied immediately. Until the airport is fully restored to normal operations, plans and procedures must clearly outline expectations for maintaining health and safety in an atypical and potentially hazardous operating environment.<sup>75</sup>

While the immediate response to Asiana 214 was relatively short in duration, lasting only a few hours, the subsequent recovery and investigations are still underway months later. SFO operations and working conditions did not immediately return to normal and many staff have since devoted a great deal of time, energy, and attention to addressing lessons learned from the event. Safety plans and procedures must acknowledge



and mitigate the ongoing risks associated with fatigue and stress, as well as delayed or lingering emotional impacts to individuals associated with response and recovery efforts. Furthermore, this recognition must extend to the full range of personnel and functions that may be impacted by recovery efforts, not simply those who respond to the airfield itself, as some staff witnessed the crash or provided direct support to injured survivors and their families and friends.

**Recommendation: Ensure operational safety is a priority, update safety plans and procedures to address recovery operations, and incorporate best practices in critical incident stress management.**

Although SFO already has safety and health programs for day-to-day operations, the EPM and recovery plans must identify roles and responsibilities for ongoing incident health and safety activities once the emergency response effort is demobilized. These include plans and checklists to guide health and safety efforts that take into consideration the additional or unusual risks present following a plane crash or similar incident. Health and safety monitoring should focus on the potential for long-term impacts, particularly for anyone exposed to the wreckage and debris.<sup>76</sup> Hazard awareness and safety training should be provided not only to all incident staff, but also to outside recovery partners and contractors.

In addition to physical and operational safety and health programs, a thorough Critical Incident Stress Management approach may be necessary to meet the mental health needs of employees exposed to highly stressful emergency situations.<sup>77</sup> Plans should clearly identify roles and responsibilities for conducting Critical Incident Stress Debriefings or psychological first aid and actively engaging with staff to provide other support resources in the aftermath of a traumatic incident, such as those offered by the Substance Abuse and Mental Health Services Administration (SAMSHA)<sup>78</sup> or the ARC.<sup>79</sup> The system

should also include developing procedures and checklists to guide short-term and long-term monitoring of personnel exhibiting significant stress responses as a result of the incident. ACRP Report 22: *Helping Airport and Air Carrier Employees Cope with Traumatic Events* provides additional guidance on identifying signs and symptoms of emotional impacts, as well as programmatic approaches to promoting “human resiliency” among those who respond to traumatic incidents.<sup>80</sup>

**Note:** It must be recognized that even before the debriefing sessions were complete and during the course of the writing and review of this report, SFO management, in partnership with its public safety and airport partners, has already taken proactive steps to plan for and where possible initiate improvements in preparedness, response, and recovery capabilities in line with the observations and recommendations contained herein. Those efforts will accelerate with the development and implementation of a comprehensive lessons learned improvement plan.

## Medical and Family Assistance Debrief Summary

On August 14, 2013, a facilitated debrief focused on medical and family assistance activities was conducted to further develop a chronology of events, capture lessons learned and promote best practices, address gaps in capabilities and identify recommendations for refinement of SFO and agency plans, and overall build a stronger emergency response team. The health and medical response to Asiana 214 was considered by participants to be generally effective and well executed. Triage, treatment, and transport were conducted according to practiced procedures, and survivors were for the most part well supported in terms of their immediate care. Similar to the previously conducted debriefs, the Medical and Family Assistance Debrief provided an opportunity to identify lessons learned and explore recommendations for improving response and recovery for future events.

Despite the degree of success in any response, there are always areas for improvement. Lessons learned were identified in the NPG core capabilities and public health priorities for situational awareness, operational coordination, public health and medical services, and mass care. These core capabilities and priorities are complex and require a comprehensive and coordinated improvement effort as well as focused work on training and exercises once plans are updated. The observations on the following pages, as drawn from the facilitated debrief, provide further detail.

### Participating Organizations

- Airport Airfield Safety
- Airport Duty Managers
- Airport Safety & Health
- American Medical Response (AMR)
- ARC
- Asiana Airlines
- CBP
- FBI
- San Francisco DEM
- San Francisco EMS
- San Francisco Fire Department (SFFD)
- SFO Medical Center
- San Francisco Police Department (SFPD)
- San Mateo County EMS
- San Mateo County Health Department
- San Mateo County Mutual Aid
- San Mateo County OES
- United Airlines
- US DHHS

## Best Practices and Lessons Learned

### Observation 19: Integrate Medical Operations into Incident Command

**The public health and medical consequences of an Alert 3 response are numerous and widespread, necessitating high-level coordination among the airport, affected airlines, responders, and healthcare facilities.**

A mass casualty incident is one where the number of injured persons exceeds the day-to-day capacity of the pre-hospital and hospital healthcare system. The public health and medical response to a mass casualty incident is too complex to be handled by on-scene first responders alone. It typically involves coordination among multiple mutual aid jurisdictions, numerous response agencies and entities, and hospitals receiving patients, sometimes as far as an hour or more away from the incident. This level of resource management can't be accomplished by the ICP alone.



As previously discussed, an EOC plays a role in supporting the on-scene incident commander's situational awareness and decision making. During a mass casualty incident, EOCs support the on-scene needs of medical personnel by gathering information on availability of hospital beds, additional personnel and transport units, and air medical assets. EOCs also find and coordinate deployment of additional resources.

During the response to the Asiana 214 crash, every county in the San Francisco Bay Area was alerted and began to gather hospital bed availability and ready emergency response units. However, there was no central repository for this information that could be seen by on-scene medical personnel. The

SFFD representative for victim transport on-scene had visibility of San Francisco hospitals and EMS assets, and the AMR representative from San Mateo had visibility of San Mateo hospitals and assets, but neither one had visibility of any other counties' data. This lack of visibility left all survivors being transported to just those two counties when, in fact, they could have been spread out much further, preventing hospitals in San Mateo and San Francisco counties from becoming over-saturated.

**Recommendation: Assign a position in the SFO EOC for Medical Operations Coordination and advocate for greater regional collaboration on information sharing and related protocols.**

The California SEMS and the CPHMEOM both address coordination of public health and medical services delivery and the coordination among multiple EOCs. To ensure maximum visibility of resource availability and minimize redundancy, it is suggested that one county EOC (either San Francisco or San Mateo) be designated to receive public health and medical information from all supporting counties and provide that information to the SFO EOC and on-scene decision makers. Assigning a central



coordinating entity to serve as the repository of hospital bed availability, ground and air ambulance availability, transport locations, and other health and medical information could significantly aid in the rapid transportation of survivors to hospitals, as well as support quick reunification of survivors with friends and family. The California SEMS provides a detailed description of EOC-to-EOC coordination and management.<sup>81</sup>

In addition, it is suggested that SFO have a public health and medical position assigned within the SFO EOC to maintain visibility on this information and support the connection between on-scene requirements and resources available through the jurisdictional EOC's relationships with the greater medical and public health community. Similar to the Public Health and Medical Services<sup>82</sup> position located in most Bay Area jurisdictional EOCs, a dedicated public health and medical position would help liaise between the on-scene medical operations staff and the ESF 8 representatives from all affected/activated counties.

The California Department of Public Health and the California Emergency Medical Services Authority support a Regional Disaster Medical Health Specialist (RDMHS) program. California is divided into six mutual aid regions and each region has a RDMHS assigned to the region to coordinate the delivery of disaster medical and health services; the Bay Area is part of Region II. The RDMHS could be in the best position to support this public health and medical position, and serve as the liaison between SFO and Public Health and Medical entities in neighboring jurisdictions. SFO could benefit from coordination with the RDMHS and regional partners to identify the most appropriate agency to provide staffing support to the SFO EOC during a response to an event involving injuries.

There are numerous entities in the Bay Area working on public health and medical services response to emergencies. Given the potential for mass casualties occurring at the airport, SFO should engage in planning with the Medical Health Operational Area Coordinator (MHOAC) assigned to San Mateo and San Francisco to ensure those jurisdictions most likely to be activated in a response are integrated into SFO plans, training, and exercises. SFO, the RDMHS, and the San Mateo and San Francisco MHOACs should conduct planning with the region's counties to develop a procedure for sharing information on asset availability and other key information during incident response. These procedures should be codified in both the SFO and jurisdictional response plans. Once developed, all medical and health personnel likely to be involved in a crash response should be trained on the procedure and that procedure should be exercised to ensure it is understood and functional during a response.

## Observation 20: On Scene Medical Operations Coordination with Regional Providers

**Medical assets available to support a response at SFO must be integrated into the overall incident management framework and operations in a way that fits each entity's mission and scope of practice.**

Across the country, Urgent Care Centers are being opened to address the gap in available primary care providers and to divert non-emergency patients from emergency departments. Urgent Care Centers provide walk-in, extended-hour access for acute illness and injury care that requires more medical

attention than can be handled by a primary care doctor, but not the level of care provided in an emergency department. These centers can also provide other preventive healthcare services such as sports, school or work physicals, and travel medicine. Typically, Urgent Care Centers offer a range of services such as fracture management, moderate wound care and stitches, and medical attention for other common injuries and illness. Urgent Care Centers are not equipped to handle heart attacks, strokes, labor and delivery, or major trauma. According to an urgent care locator, there are 226 Urgent Care Centers in California and more than 7,000 centers across the country.<sup>83</sup>

The SFO has an on-site Urgent Care Center (the SFO Medical Center) operated as an extension of St. Mary's Medical Center, part of Dignity Health. It is located in the International Terminal Main Hall, on the Boarding A side, Departures/Ticketing Level, pre-security. It is staffed by physicians, nurses, and medical assistants and can provide a host of assessment, diagnostics, and treatment functions.

The ability of EMS units to transport to Urgent Care Centers is a challenge facing every State and the decision to allow such triaging and transport varies widely among state and local EMS agencies. The SFO Medical Center is not designated as an EMS receiving center by San Mateo County's Local Emergency Medical Services Agency. Thus, at the present time, patients must come to the center on their own and cannot be transported to the center by EMS units. On a normal day, if a 911 call is made on airport grounds and the SFFD



responding units determine the patient requires transport to a definitive care facility, SFFD must call an ambulance from San Mateo County and transport to an offsite hospital.

Using the SFO Medical Center resources to support an incident will disrupt its normal patient flow of walk-in patients and occupational medicine needs for the SFO workforce. However, SFO Medical Center is equipped to evaluate and treat minor injuries and could serve to decompress hospital emergency departments in the event of a mass casualty incident. According to the current SFO response plan, SFO Medical Center personnel are requested to report to the crash site during an Alert 3 and escort survivors to the Reflection Room and In Transit Lounges to support reunification and provide aide to minor injured survivors. However, the SFO Medical Center personnel have limited capability in the field and there is some disagreement about their liability coverage and facility licensure outside of the doors of their clinic. Inside their Medical Center, they have diagnostic and procedural capabilities far exceeding that in the field.

**Recommendation: Conduct an assessment and determine the most effective and efficient use of the SFO Medical Center in coordination with other medical assets available for incident response.**

Pre-event planning is focused on identifying potential hazards or risks (such as the risk for a mass casualty event occurring at an airport), assessing what resources will be needed to address the risk, and determining the capabilities of the resources available to responders. Following an Alert 3, some of the resource allocation decision-making will need to focus on how to provide care to crash survivors and who is best to provide it. As part of this assessment of capabilities, issues of liability and licensure must be addressed to determine where care can be provided. Further discussion is needed between Dignity Health, SFO leadership, SFO Medical Center, SFFD AB, and San Mateo local EMS agency to determine the full scope of use of the Medical Center during an Alert 3 by assessing legal limitations and clinic capabilities.

SFO Medical Center and Dignity Health could explore with the San Mateo local EMS agency the steps that can be taken to allow EMS units to transport patients to the SFO Medical Center in lieu of a hospital emergency department. A possible example of this operation is a Dignity Health Urgent Care Clinic operating in a San Francisco stadium with authority to treat and release from the facility. Currently, a bypass agreement is in place in San Francisco at their stadium, allowing EMS units at various sporting events to bypass hospitals and transport to the established on-site clinic. This arrangement should serve as a best practice for establishing a similar procedure. This agreement could also be constrained so that transport to the SFO Medical Center is only permitted in the event of an airline incident that involves injuries received at the airport. Regular or routine emergencies could still be handled through the existing procedure of transporting to hospitals.

All decisions regarding the extent of Medical Center operations, location, and integration of Medical Center medical services, as well as transport arrangements for an Alert 3, should be reflected in the revised EPM and associated procedures, checklists, and any necessary legal agreements (e.g., mutual aid agreements, memorandum of agreement/understanding, etc.). The SFO Medical Center should also develop crash-specific treatment protocols, as well as plans for managing surge staffing and conducting staff recall. SFO Medical Center leadership should participate in the morbidity and mortality review discussed in Observation 22 to help inform these treatment protocols and the development of criteria for survivor referral to the Medical Center versus a hospital.

**Observation 21: Standardized Triage**

**As a technique used to sort victims of a mass casualty incident, the proper application of common triage protocols in a multi-jurisdiction response is essential to minimizing confusion and good patient care.**

The immediate priority of first responders and emergency medical services personnel is the health and safety of the victims of the crash. The standard practice for all first responders arriving on the scene of a mass casualty incident is to immediately assess the safety of the scene for responding personnel and victims and begin triage, i.e., the process of sorting the victims into categories to receive treatment and transportation to hospitals. Triage processes employed throughout most of the United States involve an initial sorting of victims into those who can walk and those who cannot. Victims who can

walk are moved away from the scene and assessed after non-ambulatory victims. All victims are eventually placed into four categories of care:

- Immediate (Red) – must receive the highest priority for treatment and transport due to life-threatening injuries, signs or symptoms
- Delayed (Yellow) – receives the second highest or delayed priority for treatment and transport, meaning they are injured and need to receive medical care, but that care can wait
- Minor injuries (Green) – involves minor injuries that can wait to be seen until all other patients are cared for
- Deceased/expectant (Black) – victim is either dead or has injuries incompatible with life and no intervention or treatment will be life-saving

There are many types of triage systems in place across the country. Both San Francisco and San Mateo counties use the Simple Triage and Rapid Treatment (START) system. The goal of triage is not to identify victims by name, but to rapidly sort and treat them so they can be removed from the site of the crash and taken to a hospital as quickly as possible. Triage tags are used to physically mark victims with their assigned triage category after EMS assesses them. All response partners must understand that victims will be tracked by EMS units through triage tag barcodes to their destination hospital, not by name.

During the triage, treatment, and transportation process, it is very common for a victim's category status to change, especially from green to yellow. Victims are initially in shock, can walk when asked to, and don't realize the extent of their injuries until they have had some time to think about where they are hurt or to exhibit signs or symptoms for first responders to notice.

During Asiana 214, responding EMS units initially used a variety of different triage tag types, which necessitated changing them out prior to transport. Although both San Francisco and San Mateo counties use the same triage protocol, some units may have been stocked with outdated supplies or with supplies that were not fully compatible or interoperable with the other jurisdiction. In addition to the confusion of changing tags, no electronic patient tracking system was used. The carefully gathered information from the scene on the number of victims sent to each facility did not get conveyed to the proper people within the SFO EOC. The result was that only two hospitals were initially contacted to locate victims even though victims had actually been transported to 15 different hospitals. This resulted in a significant delay in the airline's ability to locate crash victims, and reunification with family and friends took up to 5 days after the crash.

**Recommendation: Unified triage procedures, standardized triage equipment, and regular training must be implemented to ensure seamless multi-jurisdictional response and patient tracking from airport to discharge.**

Standardization of procedures, equipment, and training among response partners who will frequently work with each other is critical to the rapid and effective handling of a mass casualty incident. Given the need for mutual aid response to mass casualty incidents at the airport, EMS agencies in San Mateo and San Francisco counties will likely respond together in the future. Meeting to discuss the

standardization of triage tags, triage procedures, and patient tracking procedures/systems could serve as an initial step in standardizing these processes throughout the Bay Area. It is also suggested that Alameda and Santa Clara counties be consulted, as they may contribute to emergency medical response for a mass casualty incident at SFO. Planning should focus on achieving interoperability on scene and ensuring procedures are in place to aid and support family reunification.

During the final drafting of this report, SFO proactively adopted San Mateo's triage processes and techniques. The airport also requested that SFFD conduct training on San Mateo's triage for all SFO response personnel by October 31, 2013. This will ensure that all partners understand the life-saving functions executed by EMS and have realistic expectations as to the identification of transported victims. Jurisdictions should refer to the Patient Tracking interoperability standard recommendations developed by the Bay Area Urban Area Security Initiative (UASI) Regional Medical Surge Planning Project. All emergency medical agencies in the region should codify standardized triage procedures in their jurisdictional plans and ensure these are also reflected in the SFO EPM.

Once developed and standardized, frequently practicing triage techniques, training on how to use the tags and any information technology solution that supports them, and establishing protocols to routinely re-assess all victims will ensure smooth application of the START triage methods. Responders will perform during a mass casualty incident as they perform on a day-to-day basis, so SFO should encourage training and exercises on triage procedures and the use of triage techniques and triage tags during non-crash responses. Many jurisdictions select days during the month where every patient seen by EMS that day is assessed, assigned a triage group, and given a triage tag. These "Triage Tag Tuesdays" provide an opportunity to reinforce triage best practices prior to a mass casualty incident.<sup>84</sup>

SFO is fortunate that most mass casualty response supplies, including triage tags, are rarely needed by EMS agencies. Unfortunately, this limited usage allows equipment to become outdated and often misplaced. With the apparent risk of mass casualty incidents at SFO, SFFD is encouraged to ensure that procedures are in place to routinely check the status of these supplies. Each response vehicle should be checked on a daily basis and supply caches should be checked monthly for outdated or damaged materiel. Old tags should be removed and replaced with the most current ones in use by their agency.

## Observation 22: Altered Standards of Care in Mass Casualty Incidents

**Standards of care must reflect that the mechanism of injury in a catastrophic plane crash is such that every passenger is considered as having the potential for serious, critical, or life threatening injuries.**

In trauma clinical management, a series of injury types are highly indicative of critical injury and automatically warrant transport to the closest appropriate trauma center. For example, a gunshot wound to the head or trunk, a high-speed motor vehicle crash, a fall from a height greater than two stories, and certain other injury types will trigger transport to a facility that will evaluate for serious injury, regardless of the signs, symptoms, or complaints from the victim.<sup>85</sup> In these types of trauma scenarios, the mechanism of the injury (i.e., the way in which the injury was sustained) is so serious



that the likelihood of incurring no major injuries is slim. An airplane falling to the ground at over 100 miles an hour is as serious a mechanism of injury as most EMS providers will ever see.

An airplane crash from significant height or with significant speed is a different mass casualty event from most. Typically in a blast event, building collapse, or mass shooting event, victims have not all suffered the same degree of impact, so applying START triage is a reasonable clinical assessment tool. In a passenger jet crash, every victim received generally the same amount of force unless they were thrown from the plane, so every victim had essentially the same probability of serious injury. Altered standards of care during disasters typically focus on delaying or substituting treatment where appropriate, to allow care to be directed to the most serious patients for whom delay or substitution of care is not an option. When the crisis is over, the non-disaster standards of care must be resumed. Altered standards of care can be easily implemented when discussed and identified prior to an event and applied as a protocol during the event. Creating just in time altered standards of care is difficult and presents significant liability issues.

During the Asiana 214 response, more than half of the survivors claimed no injuries at the crash site and were not immediately transported to area hospitals.

Given the force caused by the jet crash, it would have been reasonable to transport every passenger on that plane to a trauma center as a trauma victim with full spinal immobilization during transport. However, in order to clear the scene, most of the patients transported were taken to non-trauma centers via bus with little or no medical intervention during transit. This is common practice during some mass casualty incidents, but not common practice in emergencies where every victim has experienced the same level of trauma. Per START triage protocols, responders may assume that because a patient is able to walk, they do not have a critical, unstable spine injury or other serious internal injury. However, the ability to walk is not an indicator that there is no cervical spine damage.



**Recommendation: Develop standard regional protocols for assessing patients and related trauma by mechanism following an airline crash and ensure these are reflected in SFO response plans.**

The response to a high-impact mechanism of injury where all victims received the same level of force is very rare for EMS, thus necessitating an approach to treatment and transport that may not be the same for any other mass casualty incident. As plane crashes with large numbers of survivors needing care is a rare event, little data is available on altered standards of care for these events.

It is suggested that the local EMS agency directors, medical directors, attending trauma surgeons from the two receiving trauma facilities, and representatives from responding EMS agencies convene a



working group to review the morbidity and mortality data from this crash. Discussion points should include:

- Triage level and eventual hospital clinical evaluation and diagnosis for all transported survivors
- Non-transported victims and subsequent hospital visits
- Discharge and re-admits
- Validation or modification of triage and trauma protocols for a passenger jet crash

START triage is a valuable tool during the initial response to a mass casualty incident that offers the greatest good to the most people, but once the initial sorting is complete and ample transport resources are available, a protocol should be developed to return to normal treatment and transport protocols. Any policies or procedures developed or modified as a result of this discussion must be codified and included in jurisdictional mass casualty response plans and EMS protocols. EMS providers should be trained on these new plans and protocols and should exercise them in a full-scale exercise with live mock victims.

### Observation 23: Family Reunification and Privacy Laws

**Following an airline crash, numerous entities need information on survivor location and health status, which can overwhelm a hospital's ability to confirm those entities' need to know and right to know the information.**

During mass casualty incidents, the priority for on scene responders is to rapidly triage, treat, and transport victims to a definitive care site, primarily emergency departments. Responders often lack the time and means to gather complete identifying information on all victims treated or transported, particularly for survivors who are unresponsive or who face language barriers. Most often victims are transported to hospitals with no information recorded except the triage tag number and their destination hospital. This is a reality of mass casualty transport and should be an assumption written into all airport response and airline family reunification plans.

On the other hand, hospitals do have the time and the on-site resources to gather complete patient identifying information and do so as a matter of practice. This means that hospitals hold the information that the airlines, NTSB, CBP, and other law enforcement agencies need to support family reunification, immigration and customs clearance, and accident investigations. However, following an airline crash, numerous entities seeking information on survivor location and health status can overwhelm a hospital's ability to quickly confirm those entities' need to know and right to know the information. Hospitals are bound by State and federal laws to maintain the privacy of all Protected Health Information for all patients. The primary law that addresses this issue is the federal Health Insurance Portability and Accountability Act (HIPAA) of 1996.

The HIPAA Privacy Rule protects the privacy of individually identifiable health information; however, exceptions to HIPAA do exist and information can be released during an emergency under the following conditions:

- Treatment: Health care providers can share patient information as necessary to provide treatment
- Notification: Health care providers can share patient information, including the individual's location, general condition, or death, as necessary to identify, locate, and notify family members, guardians, or anyone else responsible for the individual's care.

These disclosures include the ability of the hospital to notify law enforcement, public health, or disaster relief agencies authorized by law or charter to assist in disaster relief efforts, such as the American Red Cross.<sup>86</sup> Emergency release of protected health information must be done in accordance with a pre-written plan from each hospital. Every hospital's plan must have the agreement of the legal staff, the HIPAA privacy officer, medical records division, and the public affairs office, at a minimum.

Asiana Airlines and their Star Alliance partner, United Airlines, attempted to gather patient information from hospitals who received survivors from Asiana 214. In most instances, hospitals would not release information to the airlines, which resulted in a significant delay in family reunification. In some instances it took the airline as long as 5 days to identify and locate survivors. This included unaccompanied minors who could not be reunited with parents.

**Recommendation: The Bay Area healthcare community must develop procedures to support the sharing of patient information to aid in Family Reunification after aircraft emergencies and other disasters.**

The need to reunify crash victims with family and friends is the key component in the Federal Aviation Disaster Family Assistance Act of 1996.<sup>87</sup> While this Act assigns responsibility for reunification to the airline operating the affected aircraft, it is clear that other entities play a role in supporting the airlines efforts towards reunification.

With SFO as a key stakeholder and facilitator, a discussion among local emergency managers, the airlines, NTSB, CBP, the ARC, local health departments, and local hospitals would be valuable in the development of a regional procedure for the gathering of the minimum essential patient information from hospitals needed for passenger accountability purposes. This may include the advance designation of a single third party entity, such as a local emergency management agency, local law enforcement jurisdiction, local health department, or local ARC chapter, to serve as the central recipient of the information on behalf of all. The ARC is an entity specifically cited in the HIPAA law and has a process and information technology tracking system in place to support family reunification. NTSB can also assign or designate a representative to gather patient information for reunification purposes, but a letter would have to be submitted and approved by the California hospital association.

Policies and procedures should be developed with care to ensure that hospitals are only contacted by the single predestinated entity (ARC or other) as suggested above and that that entity is recognized as a trusted agent who can effectively manage access to this protected information. The benefit of such a process is that SFO can rely on a single known and trusted third party to assist it and its public safety and airline partners in passenger accountability and family reunification in a more simplified and uniform manner. Once developed, these procedures must be documented, trained to, and exercised with all appropriate parties to ensure smooth and effective implementation in a crisis.

It is strongly suggested that every hospital in the San Francisco Bay Area develop a HIPAA Privacy and Disclosures in Emergency Situations Plan using information from the US Department of Health and Human Services [HIPAA Emergency Preparedness Planning and Response web page](#).<sup>88</sup> Hospital Preparedness Program Coordinators for each county are encouraged to work with the hospitals and with local emergency managers to ensure procedures are in place to permit the release of information to those entities with a valid right to know for family reunification purposes. During these discussions, SFO should of course be engaged to ensure that the procedures meet the needs of the airport as identified following the Asiana 214 incident. However, it is suggested that the development of common procedures for the sharing of information for family reunification should not be limited to aviation incidents alone. Such procedures are applicable to all major emergencies and regional adoption will help to ensure widespread familiarity and consistent application regardless of the nature of the event. Accordingly, local emergency managers can accelerate regional adoption of common family reunification procedures within their jurisdictions by incorporating them into their ongoing mass casualty response training and exercise programs for non-aviation related emergencies.

## Observation 24: Mass Care Support at the Airport

**Surviving passengers uninjured by the crash must be located, accounted for, and supported on-site until family reunification is achieved and/or until suitable lodging is procured.**

The NTSB has published the Federal Family Assistance Plan for Aviation Disasters<sup>89</sup> that highlights responsibilities and actions all partners must take following aviation disasters. This plan focuses on the post-incident establishment and management of a formal Family Assistance Center. The Family Assistance Center is a physical location where family and friends are directed to find information on their loved ones and to connect with airline and other officials about support services available to them. This location is also used, in the event of a mass fatality event, to support information gathering to identify remains and perform death notifications, once identities are confirmed. This location offers a host of services, including disaster behavioral health counselors, assistance with finding local housing, assistance with traveling, assistance with any financial support allowable, victim identification, and other services enumerated in the plan.

A formal and well-established Family Assistance Center will likely take time to mobilize in a crisis, yet appropriate personal care must be provided as soon as possible to survivors, family, and friends. In the interim, prior to the full establishment of a Family Assistance Center but once removed from the immediate site of a crash or the airfield proper, survivors must be made comfortable and provided medical and disaster behavioral health attention in close proximity that will allow for the following:

- Access for medical personnel to continuously re-evaluate survivors for signs of delayed trauma
- Sufficient room and access for ambulance stretchers and wheelchairs
- Access to male and female restrooms
- Security by law enforcement personnel and with no media access
- Space for registration and airline/airport administrative functions following a crash

- Space for Customs and Border Patrol to process international flight passengers
- Space for Disaster Behavioral Health support
- Separate room nearby for family reunification

Given the requirements associated with appropriate locations for survivor support and family/friends, selection of the site and arrangements must be made ahead of time. When a crash alert is announced, a team should immediately report to the assigned rooms and begin preparing them for passenger arrival. Security personnel must also immediately secure the rooms and pathways for ingress and egress from those rooms. These locations may be needed for extended periods of time, because finding suitable off-site lodging for all survivors, friends, and family will take time. Pre-identifying and equipping a fixed location for use as the formal Family Assistance Center will decrease the time needed to mobilize the center and speed the delivery of these services to those in need.

During the Asiana 214 crash response, the SFO Reflection Room was planned to be used for family reunification but was quickly rendered unusable because it was not secure and quickly overrun by the media. The United Red Carpet Club and the In Transit Lounge were used as alternatives but immediate access to ambulances was limited. Such access proved essential as a large number of passengers required subsequent transport to the hospital after being relocated to these rooms.

**Recommendation: Plans must identify locations suitable for supporting survivors, family, and friends following a crash and associated preparations to be conducted at the time of a crash alert.**

Caring for survivors of a disaster requires quick action and coordination from all parties involved. The manner in which survivors, friends, and family are treated following any event, but especially following a severe crash with injuries, will resonate with these survivors and their friends and family for years to come. If the response felt harried and disorganized, where people were constantly being shuffled from room to room and no supplies or commodities were provided, they will not feel well cared for. This feeling will remain with them and will reflect negatively on both the airline and the airport involved. If the response was swift, authoritative, and coordinated, people will remember how well they were treated.

Supporting victims, family and friends requires coordination from multiple entities both within and outside of SFO. It is suggested that SFO, SFFD, American Red Cross, San Mateo and San Francisco emergency managers and public health staff, airline representatives, and airport security personnel form a Family Assistance/Reunification Working Group. This working group should meet and address the following items:

- Identification of alternate locations within the airport to place survivors and family/friends that meet the requirements described above
- Pre-identification and training of staff to open, secure, and manage these locations
- Procurement of a readily available cache of equipment and supplies that can be either stored in or delivered to those rooms within 15 minutes of activation<sup>90</sup>
- Development of procedures for processing survivors once they are escorted to the room

- Development of procedures to continually re-evaluate survivors' medical conditions both on-site and off-site, including a plan to obtain medical care support from the SFO Medical Center, as appropriate
- Establishment of contingent contracts with local hotels to provide lodging for survivors and families and support to a Family Assistance Center

One best practice model for Family Assistance Centers is provided by the Seattle and King County Health Department, which is identified as an Advanced Practice Center by the Centers for Disease Control and Prevention and the National Association of County and City Health Officials. As a part of this designation, they have developed a detailed [Family Assistance Center Toolkit](#)<sup>91</sup> to assist jurisdictions in pre-planning and executing Family Assistance Centers following a mass fatality or mass casualty event, including plans, job action sheets, checklists and equipment lists. SFO and its partners should review these resources when developing their own plans and procedures.<sup>92</sup>

Planned before the Asiana 214 incident, SFO is completing work on a space in Terminal 2, to be completed in December 2013, which will be used to support passenger assistance and family reunification functions during airport emergencies. The space is 4,600 square feet, will handle about 500 people, is accessible from the airfield through a secure door, and includes basic amenities such as restrooms, multiple power stations for personal electronic needs, and easy access to food and drink.

## Observation 25: Demobilization Notification

**On demobilizing from an incident, proper and timely “stand down” notification of all public health and medical assets alerted or activated ensures those resources are available for other priorities.**

As discussed throughout this report, the response to a mass casualty event will require more resources than are typically available on a day-to-day basis. As standard practice, when a mass casualty event occurs, the affected jurisdiction will notify surrounding jurisdictions of the event and often will ask what resources are available to respond in support of the incident. This includes determining the availability of fire suppression equipment, air and ground ambulances, and hospital beds. In order to shorten the time to respond to requests, the response agencies will begin calling in extra staff and will mobilize equipment and resources. Hospitals will typically cancel non-emergency procedures, cancel admissions on patients scheduled for elective procedures, call in extra staff, discharge patients early, and undertake other expensive, but necessary procedures. Once the influx of patients is over, staff can be sent home, elective procedures can resume, and patients already admitted to the hospital can stay and continue recovering. When operations are terminated on-site, all EMS agencies, health departments, and hospitals initially notified of the incident must be contacted and notified to stand down their readiness posture. Maintaining this readiness posture can be expensive and exhausts already limited resources.

As discussed in previous observations on EOC operations, resource and asset management is one of the most important functions of an EOC. Resource management includes knowing who to contact (and through what mechanism) to access all needed resources; knowing where those resources are once they arrive on scene; and notifying all entities when the need for those resources no longer exists. The

Incident Commander makes the decision to clear resources and terminate the incident. This information is passed to the EOC. The EOC notifies all partners to “stand down.” Demobilization notifications should follow the same process as initial incident notification and mobilization.

Following Asiana 214, numerous local hospitals remained at an elevated level of readiness for many hours after on-site operations had shut down, unaware that they would never receive patients because their local EOCs never relayed information on the termination of the event. The same mechanism and process used to alert and activate should be used to demobilize.

**Recommendation: Create checklists and update the SFO EPM and regional disaster response and emergency medical plans as needed to reflect demobilization and stand-down notification guidance.**

Communicating EEIs to all response partners is a critical function of EOCs. Pre-identifying those EEIs and establishing incident-specific CIRs ensures that information to support decision making is available to all partners. The termination of the on-scene operations of an incident is an EEI and should be reflected in the EPM and jurisdictional response plans as a key piece of information to share.

Establishing procedures and checklists for the Demobilization Unit Leader within the Planning Section would be a way to ensure one position is responsible for this action.<sup>93</sup>

## Observation 26: Immigration and Customs for Victims

**Airport emergency response must consider the ongoing need for homeland security and public safety and engage federal partners accordingly, to include any support those agencies may provide in return.**

All visitors and residents of the United States traveling on international flights must go through customs upon entry to the United States. CBP agents can process survivors at any location within the airport. Survivors can also be processed off-site, but CBP must know their location if they are transported off-site to a hospital. CBP agents will need the manifest from the airlines and a list of receiving hospitals in order to reconcile the list and complete all necessary processing of survivors.

Following Asiana 214, CBP agents independently contacted all affected hospitals to account for and process transported survivors. CBP was able to account for all survivors within 2 days of the crash. This was significantly faster than the airline was able to reconcile the list, primarily because hospitals were willing to share Protected Health Information with CBP agents. As previously noted, CBP was one of several different agencies attempting to obtain similar information about transported survivors.

**Recommendation: Engage CBP in the planning for on-site survivor support to ensure they receive all necessary information for processing survivors and seek its assistance in accounting for those survivors.**

The success of the CBP processing and identification of victims should serve as a positive lesson-learned for all response partners and a strategy to fully integrate CBP agents into patient tracking and family reunification efforts for incidents involving international flights. It is suggested that SFO codify the successful process used by CBP during Asiana 214 for future responses. SFO, SFFD, AMR, and CBP should meet to develop a procedure to ensure all international passengers who survive a crash are processed by CBP. This procedure should include on-site processing and CBP should be included in planning for the establishment of an on-site survivor collection point as previously described. This



procedure must also detail communication among SFFD and AMR and CBP on transport locations of victims and numbers of victims triaged and not transported. The public health and medical representative in the SFO EOC should be used as a conduit for this information. This procedure should be codified in SFO, SFFD, AMR, and CBP response plans.

### **Observation 27: Management of Unaccompanied Minors and Other Dependents**

**The coordination of care and follow-on support to unaccompanied minors is the responsibility of a number of response entities and all must understand related process, roles, and responsibilities.**

An unaccompanied minor is an airline passenger generally between the ages of 5 and 14 (air carrier policies may vary) who travels without an accompanying adult. Many children travel as unaccompanied minors on passenger aircraft. Children could also travel as part of a large group with chaperones who are not legal guardians. When an airline crash occurs, these children are legally the responsibility of the airline, but are transported to various locations for medical treatment with no guardian with them. Once they are transported to the hospital, the care and supervision of the children becomes a combined issue for the airport, the airlines, local law enforcement, and the local child welfare offices.

Sixty unaccompanied minors were on board Asiana 214. Most of those children were part of a summer camp abroad program. Due to the difficulty of tracking patients who were transported to hospitals, many of these children were not reunited with legal guardians for as many as 5 days following the crash. One hospital admitted 11 children, not for medical necessity, but because they felt they had no good alternative to contacting social services and no one else to legally take the children. Other children were separated from parents who were on the plane with them because they were transported to different hospitals.

**Recommendation: Airline and SFO emergency response plans should include procedures for the management of unaccompanied and separated minors following an airline incident.**

A coordinated pre-written procedure can lessen the confusion that will occur following a crash. This plan should address the sudden need for temporary guardianship of unaccompanied minors or children whose parents or guardians are either killed or injured in a crash. United Nations Children's Fund (UNICEF) has developed a guide for managing unaccompanied and separated children in disasters,<sup>94</sup> the National Center for Disaster Medicine and Public Health has developed a reference card for health professionals,<sup>95</sup> and the ARC has developed guidance for the management of unaccompanied minors in shelters. These resources should inform the development of a process for managing unaccompanied minors following an airline incident.

SFO, SFFD, AMR, the airlines in residence, local law enforcement, the American Red Cross, and local child welfare offices should develop a process to address the sudden need for temporary guardianship and housing of unaccompanied minors or children whose parents are either killed or injured in a crash. Keeping children with their families should be the first priority, so transporting children to the hospital with a family member should be done whenever possible. This process should be codified in



SFO and local response plans and circulated to response agencies and all receiving hospitals. Training and exercises of the plan should be conducted with all involved parties.

**Note:** It must be recognized that even before the debriefing sessions were complete and during the course of the writing and review of this report, SFO management, in partnership with its public safety and airport partners, has already taken proactive steps to plan for and where possible initiate improvements in preparedness, response, and recovery capabilities in line with the observations and recommendations contained herein. Those efforts will accelerate with the development and implementation of a comprehensive lessons learned improvement plan.

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## Appendix B: Acronyms

Acronym	Definition
AAR	After Action Report
AB	Airport Bureau
AC	Advisory Circular
ACI-NA	Airports Council International - North America
ACRP	Airport Cooperative Research Program
AEP	Airport Emergency Plan
AMR	American Medical Response
AMR	American Medical Response
ARC	American Red Cross
ARFF	Airport Rescue and Fire-Fighting
ASO	Airport Safety Officer
ASPR	Assistant Secretary for Preparedness and Response
ATCT	Air Traffic Control Tower
BayRICS	Bay Area Regional Interoperable Communication System
BCP	Business Continuity Plan
BIA	Business Impact Analysis
CAL-OES	California Office of Emergency Services
CBP	U.S. Customs Border Protection
CCTV	Closed-Circuit Television
CDC	Centers for Disease Control and Prevention
CERS	San Francisco Citywide Emergency Radio System
CERT	Community Emergency Response Team
CFR	Code of Federal Regulations
CIR	Critical Information Requirement
CMS	Crisis Management System
CPG	Comprehensive Preparedness Guide
CPHMEOM	California Public Health and Medical Emergency Operations Manual
DEM	Department of Emergency Management
ECG	Executive Command Group



EEI	Essential Elements of Information
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EPM	Emergency Procedures Manual
ESF	Emergency Support Function
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FEMA	Federal Emergency Management Agency
HIPAA	Health Insurance Portability and Accountability Act
HPP	Hospital Preparedness Programs
HSEEP	Homeland Security Exercise and Evaluation Program
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
IIC	Investigator-in-Charge
IMT	Incident Management Team
IPAWS	Integrated Public Alert and Warning System
JIC	Joint Information Center
JIS	Joint Information Systems
MEDEVAC	Medical Evacuation
MHOAC	Medical Health Operational Area Coordinator
NIMS	National Incident Management System
NPG	National Preparedness Goal
NTSB	National Transportation Safety Board
OES	Office of Emergency Services
PDRM	Post Disaster Rebuild Methodology
PDT	Pacific Daylight Time
PHEP	Public Health Emergency Preparedness
PIO	Public Information Officer
RDMHS	Regional Disaster Medical Health Specialist
SAC	Special Agent in Charge
SAMSHA	Substance Abuse and Mental Health Services Administration



SCIP	Statewide Communications Interoperability Plan
SEMS	Standardized Emergency Management System
SFFD	San Francisco Fire Department
SFO	San Francisco Airport
SFPD	San Francisco Police Department
SITREP	Situation Report
SLG	State and Local Guide
SOP	Standard Operating Procedure
SPOTREP	Spot Report
START	Simple Triage and Rapid Treatment
TSA	Transportation Security Administration
UASI	Urban Area Security Initiative
UNICEF	United Nations Children’s Fund

## Appendix C: Photo Sources and Endnotes

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- <sup>45</sup> SEMS Resource Ordering and Tracking: A Guide for State and Local Government, [http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CCoQFjAA&url=http%3A%2F%2Fwww.calema.ca.gov%2Fplanningandpreparedness%2Fdocuments%2Fsemsresourceorderingguide.pdf&ei=nZJgUvrbE8\\_B4APb3YGwAQ&usg=AFQjCNHAPntyKV\\_vg65EFSo37-n4ZQy7\\_A&sig2=1v57QQxtMJnPGuWTB\\_9NA&bvm=bv.54176721,d.dmg](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=1&ved=0CCoQFjAA&url=http%3A%2F%2Fwww.calema.ca.gov%2Fplanningandpreparedness%2Fdocuments%2Fsemsresourceorderingguide.pdf&ei=nZJgUvrbE8_B4APb3YGwAQ&usg=AFQjCNHAPntyKV_vg65EFSo37-n4ZQy7_A&sig2=1v57QQxtMJnPGuWTB_9NA&bvm=bv.54176721,d.dmg)
- <sup>46</sup> SEMS Resource Ordering Guide. “SEMS Resource Ordering and Tracking: A guide for State and Local Government”, <http://www.calema.ca.gov/planningandpreparedness/pages/standardized-emergency-management-system.aspx>
- <sup>47</sup> SMC MCI, [http://smchealth.org/sites/default/files/docs/EMS/Operations9\\_MCI\\_Nov\\_2011.pdf](http://smchealth.org/sites/default/files/docs/EMS/Operations9_MCI_Nov_2011.pdf)
- <sup>48</sup> California Public Health and Medical Emergency Operations Manual, [http://www.emsa.ca.gov/Media/Default/PDF/EOM712011\(2\).pdf](http://www.emsa.ca.gov/Media/Default/PDF/EOM712011(2).pdf)
- <sup>49</sup> FAA AC 2000-59, [http://rgl.faa.gov/Regulatory\\_and\\_Guidance\\_Library/rgAdvisoryCircular.nsf/list/AC%2000-59/\\$FILE/ac00-59.pdf](http://rgl.faa.gov/Regulatory_and_Guidance_Library/rgAdvisoryCircular.nsf/list/AC%2000-59/$FILE/ac00-59.pdf)
- <sup>50</sup> FAA Disaster Airspace Management, <http://info.publicintelligence.net/FAA-DisasterAirspaceManagement.pdf>
- <sup>51</sup> NWCG, [http://www.nwcg.gov/pms/pubs/pms510/00\\_pms510.pdf](http://www.nwcg.gov/pms/pubs/pms510/00_pms510.pdf)
- <sup>52</sup> CFR Title 14 Vol 3, <http://www.gpo.gov/fdsys/pkg/CFR-2011-title14-vol3/pdf/CFR-2011-title14-vol3-sec139-325.pdf>

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- <sup>53</sup> FAA, [http://www.faa.gov/documentLibrary/media/150\\_5200\\_31c\\_chg1.pdf](http://www.faa.gov/documentLibrary/media/150_5200_31c_chg1.pdf)
- <sup>54</sup> FEMA SLG 101, <http://www.fema.gov/pdf/plan/slg101.pdf>
- <sup>55</sup> FEMA CPG 101, [http://www.fema.gov/pdf/about/divisions/npd/CPG\\_101\\_V2.pdf](http://www.fema.gov/pdf/about/divisions/npd/CPG_101_V2.pdf)
- <sup>56</sup> SMC EOP 2011, [http://www.smcsheriff.com/sites/default/files/downloads/EOP\\_2011\\_Final.pdf](http://www.smcsheriff.com/sites/default/files/downloads/EOP_2011_Final.pdf)
- <sup>57</sup> SFDEM, <http://sfdem.org/modules/showdocument.aspx?documentid=1304>
- <sup>58</sup> Bay Area UASI Strategy, [http://www.bauasi.org/sites/default/files/resources/091312%20Agenda%20Item%208%20Bay%20Area%20EPIW%20Strategy%20Summary\\_0.pdf](http://www.bauasi.org/sites/default/files/resources/091312%20Agenda%20Item%208%20Bay%20Area%20EPIW%20Strategy%20Summary_0.pdf)
- <sup>59</sup> ACRP, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=2799>
- <sup>60</sup> FEMA PS Prep, <http://www.fema.gov/about-ps-preptm>
- <sup>61</sup> National Disaster Recovery Framework (NDRF), <http://www.fema.gov/national-disaster-recovery-framework-0>
- <sup>62</sup> National Fire Protection Association (NFPA) Standard 1561: Standard on Emergency Services Incident Management System, page 1561-28, <http://www.nfpa.org/codes-and-standards/document-information-pages?mode=code&code=1561&DocNum=1561>
- <sup>63</sup> Whole Community, <http://www.fema.gov/national-preparedness/whole-community>
- <sup>64</sup> Disaster Recovery Project Management: Bringing Order from Chaos, Randy Rapp, [http://books.google.com/books?id=Lvg-U48oubUC&pg=PR4&lpg=PR4&dq=Disaster+Recovery+Project+Management:+Bringing+Order+from+Chaos,+Randy+Rapp&source=bl&ots=YTqwHXc3c\\_&sig=7R95lx7X1truOJSnvMqwXbwJXPA&hl=en&sa=X&ei=ORFYUr3FLOGdyQHsnYHIDA&ved=0CGYQ6AEwBQ#v=onepage&q=Disaster%20Recovery%20Project%20Management%3A%20Bringing%20Order%20from%20Chaos%2C%20Randy%20Rapp&f=false](http://books.google.com/books?id=Lvg-U48oubUC&pg=PR4&lpg=PR4&dq=Disaster+Recovery+Project+Management:+Bringing+Order+from+Chaos,+Randy+Rapp&source=bl&ots=YTqwHXc3c_&sig=7R95lx7X1truOJSnvMqwXbwJXPA&hl=en&sa=X&ei=ORFYUr3FLOGdyQHsnYHIDA&ved=0CGYQ6AEwBQ#v=onepage&q=Disaster%20Recovery%20Project%20Management%3A%20Bringing%20Order%20from%20Chaos%2C%20Randy%20Rapp&f=false)
- <sup>65</sup> DRPM, <http://www.thepress.purdue.edu/titles/disaster-recovery-project-management-bringing-order-chaos>
- <sup>66</sup> *Role of Airports in Disasters*, Perkins, page 9, <http://quake.abag.ca.gov/wp-content/documents/Airports/Role-of-Airports-in-Disasters-Perkins-FINAL-May-31-2013.pdf>
- <sup>67</sup> PMI, <http://marketplace.pmi.org/Pages/ProductDetail.aspx?GMProduct=00101128400&iss=1>
- <sup>68</sup> ACRP, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3044>
- <sup>69</sup> NTSB, <http://www.nts.gov/investigations/process.html> (8/29/2013)
- <sup>70</sup> NTSB, [http://www.nts.gov/doclib/forms/NTSB\\_Investigation\\_Party\\_Form.pdf](http://www.nts.gov/doclib/forms/NTSB_Investigation_Party_Form.pdf) (8/29/13)
- <sup>71</sup> NTSB, <http://www.nts.gov/trainingcenter/CourseInfo/2014/AS301.html>
- <sup>72</sup> Airport Cooperative Research Program (ACRP) Project 04-13: Integrating Community Emergency Response Teams (CERT), <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3045>
- <sup>73</sup> ACRP, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3045>
- <sup>74</sup> Psychological First Aid, <http://www.nctsn.org/content/psychological-first-aid>
- <sup>75</sup> CDC, <http://www.cdc.gov/niosh/docs/2004-144/pdfs/2004-144.pdf>
- <sup>76</sup> FEMA Health and Worker Safety Annex, <http://www.fema.gov/pdf/emergency/nrf/nrf-support-wsh.pdf>
- <sup>77</sup> SLTC Emergency Preparedness Guides, <https://www.osha.gov/SLTC/emergencypreparedness/guides/critical.html>
- <sup>78</sup> SAMSHA, <http://www.samhsa.gov/trauma/>
- <sup>79</sup> American Red Cross, <http://www.redcross.org/find-help/disaster-recovery/recovering-emotionally>
- <sup>80</sup> ACRP, <http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1586>



- <sup>81</sup> California Standardized Emergency Management System, <http://www.calema.ca.gov/planningandpreparedness/pages/standardized-emergency-management-system.aspx>
- <sup>82</sup> National Response Framework Emergency Support Function #8 Public Health and Medical Services Annex, [http://www.fema.gov/media-library-data/20130726-1914-25045-5673/final\\_esf\\_8\\_public\\_health\\_medical\\_20130501.pdf](http://www.fema.gov/media-library-data/20130726-1914-25045-5673/final_esf_8_public_health_medical_20130501.pdf) (May 2, 2013)
- <sup>83</sup> Urgent Care Locator, <http://www.urgentcarelocations.com/>
- <sup>84</sup> EMS World, <http://www.emsworld.com/article/10323646/creating-realistic-training-every-day-triage-tuesday> & Everyday EMS Tips, <http://everydayemstips.com/triage-tuesday-does-your-agency-practice-triage-regularly/>
- <sup>85</sup> San Francisco Emergency Medical Services Agency Protocols, <http://www.sfdem.org/Modules/ShowDocument.aspx?documentid=1821>
- <sup>86</sup> HIPAA Privacy and Disclosures in Emergency Situations, <http://www.hhs.gov/ocr/privacy/hipaa/understanding/special/emergency/katrinanhipaa.pdf>
- <sup>87</sup> Federal Aviation Disaster Family Assistance Act of 1996, <http://www.gpo.gov/fdsys/pkg/PLAW-104publ264/pdf/PLAW-104publ264.pdf>
- <sup>88</sup> HIPAA Emergency Preparedness and Response, <http://www.hhs.gov/ocr/privacy/hipaa/understanding/special/emergency/index.html>
- <sup>89</sup> NTSB Federal Family Assistance Plan for Aviation Disasters, <http://www.nts.gov/doclib/tda/Federal-Family-Plan-Aviation-Disasters-rev-12-2008.pdf>
- <sup>90</sup> Seattle and King County Public Health Family Assistance Center Equipment and Supplies Checklist, <http://www.apctoolkits.com/family-assistance-center/components-plan/logistics/>
- <sup>91</sup> Family Assistance Center, <http://www.apctoolkits.com/family-assistance-center/>
- <sup>92</sup> Seattle and King County Public Health Family Assistance Center Tool Kit, <http://www.apctoolkits.com/family-assistance-center/user-guide/>
- <sup>93</sup> Demobilization Unit Leader Position Specific Checklist from FEMA, [http://training.fema.gov/EMIWeb/is/ICSResource/assets/DemUL\\_PCL.pdf](http://training.fema.gov/EMIWeb/is/ICSResource/assets/DemUL_PCL.pdf)
- <sup>94</sup> UNICEF Inter-agency Guiding Principles and Unaccompanied and Separated Children, [http://www.unicef.org/violencestudy/pdf/IAG\\_UASCs.pdf](http://www.unicef.org/violencestudy/pdf/IAG_UASCs.pdf)
- <sup>95</sup> Tracking and Reunification of Children in Disasters: A Reference for Health Professionals, [http://ncdmph.usuhs.edu/Learn/PedsTR/images/cards/USUHS\\_TR\\_card\\_detailed.pdf](http://ncdmph.usuhs.edu/Learn/PedsTR/images/cards/USUHS_TR_card_detailed.pdf)

# **ATTACHMENT E**

**Accident Investigation Party Submission  
by the City and County of San Francisco  
under 49 CFR § 845.27**

**NTSB Accident File: DCA13MA120**



AIRPORTS COMMISSION  
SAN FRANCISCO INTERNATIONAL AIRPORT  
CITY & COUNTY OF SAN FRANCISCO

January 16, 2014

Chief David Whitaker  
Chairman, Aircraft Rescue and Fire Fighting Working Group  
P.O. Box 1539  
Grapevine, TX 76051

Re: Development of Protocols to Reduce Risk of Secondary Strikes

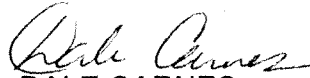
Dear Chief Whitaker:

As you know, I recently appeared before the National Transportation Safety Board (NTSB) in an Investigative Hearing held in conjunction with its investigation into the crash of Asiana Airlines Flight 214 at San Francisco International Airport on July 6, 2013. I very much appreciated the fact that we were on the same panel of witnesses at that Investigative Hearing. I would like to take this opportunity to thank you for your testimony representing the Aircraft Rescue and Fire Fighting (ARFF) Working Group. Your testimony reflected your extensive ARFF experience and very effectively represented the interests and concerns of the ARFF community.

One subject of inquiry at the Investigative Hearing involved the post-crash emergency response at SFO, including the accidental rollover of a deceased passenger by two firefighting vehicles. As a post-accident initiative, the San Francisco Fire Department-Airport Bureau is actively working on developing strategies to lessen the potential for firefighting vehicles striking accident victims, including deceased victims, during emergency responses to ARFF incidents. As you can imagine, that is not a simple objective considering the variety of scenarios to which an ARFF team could be required to respond and the competing priorities that can be imposed on responders during a mass casualty response. In the process of our review, we do not want to unintentionally set unattainable standards for the ARFF community, particularly not without consulting the ARFF Working Group.

Accordingly, with this letter, I invite the ARFF Working Group to work collaboratively with the San Francisco Fire Department and other key stakeholders to develop policies and protocols to reduce the risk of secondary strikes in the future. I offer my services to assist in this endeavor. I look forward to your response, and thank you.

Very truly yours,



DALE CARNES

Assistant Deputy Chief

San Francisco Fire Department

San Francisco International Airport

cc: Tryg McCoy, Chief Operating Officer, San Francisco International Airport  
Sheryl L. Bregman, Airport General Counsel  
Alicia Cabrera, Deputy City Attorney, Office of the San Francisco City Attorney  
Mark A. Gonzales, Deputy Chief of Operations, San Francisco Fire Department



AIRPORTS COMMISSION  
SAN FRANCISCO INTERNATIONAL AIRPORT  
CITY & COUNTY OF SAN FRANCISCO

January 16, 2014

**By Facsimile and U.S. Mail**

Robert J. Foucrault  
San Mateo County Coroner  
San Mateo County Coroner's Office  
50 Tower Road  
San Mateo, CA 94402  
FAX: (650) 571-6258

Re: Development of Protocols for Handling Deceased Victims on an Airfield

Dear Mr. Foucrault:

As you may know, I recently appeared before the National Transportation Safety Board (NTSB) Investigative Hearing held in conjunction with its investigation into the crash of Asiana Airlines Flight 214 at San Francisco International Airport on July 6, 2013. One subject of inquiry at the Investigative Hearing involved the post-crash emergency response at SFO, including the accidental rollover of a victim by two firefighting vehicles. As a post-accident initiative, the San Francisco Fire Department-Airport Bureau is actively working with the Aircraft Rescue and Fire Fighting ("ARFF") community on strategies to lessen the potential for firefighting vehicles striking accident victims, including deceased victims, during emergency responses to ARFF incidents. We have reached out to the ARFF Working Group to develop workable national standards or strategies for avoiding the risk of rollovers during an active ARFF operation.

In furtherance of this objective, the Airport Rescue Division at SFO requests guidance from the San Mateo County Coroner's Office. This guidance will greatly influence the policies we develop and how we respond to future ARFF incidents at the airport.

With this letter, I invite you to work collaboratively with the SFFD to develop a clear policy or protocol as to the removal, or if necessary, retention in the location and position where found, of deceased victims at risk of a secondary strike during active rescue and firefighting operations. I look forward to your response, and thank you.

Very truly yours,



DALE CARNES

Assistant Deputy Chief  
San Francisco Fire Department  
San Francisco International Airport

cc: Tryg McCoy, Chief Operating Officer, San Francisco International Airport  
Sheryl L. Bregman, Airport General Counsel  
Alicia Cabrera, Deputy City Attorney, Office of the San Francisco City Attorney  
Mark A. Gonzales, Deputy Chief of Operations, San Francisco Fire Department  
Brian E. Kulich, Deputy County Counsel, San Mateo County



# **ATTACHMENT F**

**Accident Investigation Party Submission  
by the City and County of San Francisco  
under 49 CFR § 845.27**

**NTSB Accident File: DCA13MA120**



## 2014 ARFF Chief's & Leadership School

### January 21-24, 2014 - Cape Coral, FL

### Schedule of Events - Tentative

#### TUESDAY, January 21, 2014

6:00 pm - 8:00 pm	Registration Open	Entrance to Hope Room
6:00 pm - 8:00 pm	"Welcome Reception" & Information Exchange Program - Exhibits Open -	Hope Room

#### WEDNESDAY, January 22, 2014

7:30 pm - 8:30 am	Breakfast w/Exhibitors	Hope Room
7:30 am - 3:30 pm	Exhibits Open	Hope Room
8:30 am - 9:00 am	Opening Ceremonies:	Rosen Room
9:00 am - 10:30 am	<u>Keynote Address:</u> "Dorothy and Leadervision - From Oz and Beyond" - Steve Rosenthal, The Training Tree	Rosen Room
10:30 am - 11:00 am	Coffee Break With the Exhibitors	Hope Room
11:00 am - 12:00 pm	<u>"FAA Updates"</u> - Marc Tonnacliff, ARFF Specialist, Federal Aviation Administration, Washington, DC	Rosen Room
12:00 pm - 1:30 pm	Lunch With the Exhibitors	Hope Room
1:30 pm - 2:15 pm	<u>"NFPA Updates from the Chair"</u> - Duane Kann - Chair, NFPA ARFF Technical Committee, Chief, Greater Orlando Airport Auth., Orlando, FL	Rosen Room
2:15 pm - 3:00pm	<u>"Northern Virginia Emergency Response System and MWAA ARFF Manual Development"</u> - Jason Graber, Captain, Metro. Washington Airports Auth., Washington, DC	Rosen Room
3:00 pm - 3:30 pm	<u>Coffee Break</u>	Hope Room
3:30 pm - 4:15 pm	<u>"ARFF PPE: Switching from Silvers to Structural Gear"</u> - Randy Krause, Fire Chief, Port of Seattle Fire Dept. -	Rosen Room

THURSDAY, January 23, 2014

7:00 am - 12:00 pm	Registration	Hope Room
7:00 am - 8:00 am	Breakfast w/Exhibitors	Hope Room
7:00 am - 3:30 pm	Exhibits Open	Hope Room
8:00 am - 9:30 am	<u>"Change - If it Were Only a Pocket Full of Cents"</u> - Steve Rosenthal, The Training Tree	Rosen Room
9:30 am - 10:15 am	<u>"Customer Service Alert 2's"</u> - Thomas Howes, Battalion Chief, Metro. Washington Airports Auth., Washington, DC	Rosen Room
10:15 am - 10:45 am	Coffee Break w/Exhibitors	Hope room
10:45 am - 11:30 pm	<u>Mutual Aid- Where Are They Going And What Happens When They Get There?</u> - Larry Lippel, Battalion Chief/ARFF, Charlotte County Fire/EMS -	Rosen Room
11:30am - 12:15 pm	<u>"Autism Awareness for the First Responder-- Fire/Rescue and Airport Staff"</u> - William Cannata, Program Director, Autism and Law Enforcement Education Coalition, Westwood, MA -	Rosen Room
12:15 pm - 1:30 pm	<u>Lunch On Your Own</u>	Hope Room
1:30 pm - 2:15 pm	<u>"Asiana Flight #214 Crash Overview- A Chief's Perspective"</u> - Dale Carnes, Airport Chief, San Francisco Fire Dept.	Rosen Room
2:15 pm - 3:00 pm	<u>Tweed New Haven Airport Accident</u> - Lori Hoffman-Soares, Airport Manager, Tweed New Haven Airport, New Haven, CT	Rosen Room
3:00 pm - 3:30 pm	<u>Coffee Break w/Exhibitors</u>	Hope Room
3:30 pm - 4:15 pm	<u>"Fusion Centers"</u> - Kristie Toruno, CFI (Central Florida Intelligence eXchange (Fusion Center)	Rosen Room

FRIDAY, January 24, 2014

7:30 am - 8:30 am	Breakfast w/Exhibitors	Hope Room
7:30 am - 11:00 am	Exhibits Open	Hope Room
8:30 am - 9:15 am	<u>Courage: The Backbone of Leadership</u> - Keith Mehrens, Assistant Chief, Denver Fire Dept./ARFF, Denver CO -	Rosen Room
9:15 am - 10:00 am	<u>Active Shooter Incidents in Airports</u> - Ted Costa, Deputy Chief, Massport Fire Rescue, E. Boston, MA	Rosen Room
10:00 am - 10:30 am	Coffee Break w/Exhibitors	Hope Room
10:30 am - 11:15 am	<u>Are you making the Best Use of GIS Technology in Emergency Management?</u> - Ryan Meyer, Mead & Hunt, Inc., Madison, WI	Rosen Room
11:00 am - 2:00 pm	<u>Exhibitor Tear-Down</u>	Rosen Room
11:15 am - 12:00 pm	<u>FAA Updates - Continued</u> - Marc Tonnacliff, ARFF Specialist, Federal Aviation Administration, Washington, DC	Rosen Room
12:00 pm - 12:15 pm	<u>Closing Ceremonies</u>	Rosen Room

For Questions or Additional Information, please contact:

Barbara Haas  
ARFF Working Group  
(817)409-1100  
[info@arffwg.org](mailto:info@arffwg.org)

OR

Kevin Miller  
American Association of Airport Executives  
(703)824-0500 Ext. 157  
[kevin.miller@aaae.org](mailto:kevin.miller@aaae.org)



**ACI-NA/SFO**  
**Operational Debriefing – Asiana 214 Accident**

**Tuesday, November 5, 2013**  
**9:00 a.m. – 3:00 p.m.**  
**San Francisco International Airport**  
**International Terminal, 5<sup>th</sup> Floor, Room 047C**

**Agenda**

8:30 Registration

9:00 Welcome and Overview Tryg McCoy, SFO Chief Operating Officer

9:15 Moving Forward Together John L. Martin, Airport Director

9:30 The First Day Key speakers involved in the incident

- Focused on the first 24 hours of the events after the crash and Lessons Learned.

12:00 Lunch

12:30 The next 6 days Key speakers involved in the Airport reopening

- Focused on the events from when the NTSB took charge to the day the Airport was fully operational and Lessons Learned.

2:00 Lessons Learned Tryg McCoy, SFO Chief Operating Officer  
Webster O'Brien, VP ICF SH&E International

2:30 Panel Discussion Facilitated

- Questions and Answers

3:00 Session concludes



## ***Managing Communications Following an Aircraft Accident or Incident***

October 24-25, 2013

### Thursday, October 24

- 8:30 WELCOMING REMARKS AND COURSE INTRODUCTION  
**Kelly Nantel –NTSB Office of Public Affairs**  
**Peter Knudson –NTSB Office of Public Affairs**  
**Lauren Peduzzi – Crisis Communications Consultant and  
former NTSB Public Affairs Officer**  
**Tara Hamilton – Crisis Communications Consultant**
- 8:45 PARTICIPANT INTRODUCTIONS
- 9:00 NTSB INVESTIGATIONS AND COMMUNICATIONS  
**Peter Knudson**
- 10:00 BREAK
- 10:10 CASE STUDY: ASIANA FLIGHT 214 LANDING ACCIDENT IN  
SAN FRANCISCO  
**Doug Yakel – San Francisco International Airport**
- 11:00 PANEL: PERSPECTIVES ON THE EVOLUTION OF THE NEWS  
MEDIA BY JOURNALISTS COVERING TRANSPORTATION  
**Alan Levin – Bloomberg News**  
**Christine Negroni – Freelance Aviation Reporter and  
Blogger**  
**Carter Yang – CBS News**  
  
**Moderated by Tara Hamilton**
- 12:15 LUNCH (catered on campus)
- 1:00 CASE STUDY: SOUTHWEST AIRLINES FLIGHT 345 HARD  
LANDING AT NEW YORK LAGUARDIA  
**Linda Rutherford – Southwest Airlines**
- 1:45 BREAK
- 1:55 TRANSPORTATION DISASTER RESPONSE: HOW ASSISTANCE  
IS PROVIDED TO FAMILY MEMBERS  
**Max Green – NTSB Office of Transportation Disaster  
Assistance**

- 3:00 BREAK
- 3:10 ACCIDENT INVESTIGATION CASE STUDY: Tutorial on the NTSB's investigation of the 1996 crash of TWA flight 800, including a visit to the on-campus lab that houses the reconstructed wreckage.  
**Dr. Paul Schuda**
- 4:00 – 5:00 GET TO KNOW YOUR FELLOW TEAM MEMBERS IN PREPARATION FOR ACCIDENT SCENARIO WORKSHOP ON FRIDAY (Food and beverages provided in lounge area)

### Friday, October 25

- 8:30 QUIZ REVIEW  
**Peter Knudson**
- 8:45 CASE STUDY: BOEING 787-9 FIRST FLIGHT CRISIS COMMUNICATIONS PLAN  
**Miles Kotay – Boeing Commercial Airplanes**
- 9:30 BREAK
- 9:40 STAYING IN YOUR LANE: VIDEOS FROM THE FRONTLINE OF CRISIS COMMUNICATIONS  
**Tara Hamilton**
- 10:40 REMARKS BY NTSB CHAIRMAN DEBBIE HERSMAN
- 11:15 BREAK
- 11:25 CRISIS COMMUNICATIONS MESSAGING  
**Lauren Peduzzi**
- 12:15 LUNCH (catered on campus)
- 1:00 ACCIDENT SCENARIO EXERCISE  
**Lauren Peduzzi**
- 2:45-3:00 CLOSING REMARKS AND COURSE EVALUATIONS